

NETWORK WORLD

The Newsweekly of User Networking Strategies

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Apple finds allies in LAN vendors

By Susan Breidenbach
West Coast Bureau Chief

SAN FRANCISCO — Apple Computer, Inc., whose Macintosh is being accepted by users in increasing numbers, is banking on the efforts of independent local network vendors to round out its connectivity strategy.

Besides its own proprietary network products, Apple is relying on third-party vendor efforts to link Macintoshes with de facto standards such as Novell, Inc.'s NetWare and 3Com Corp.'s 3+Open, a network operating system based on Microsoft Corp.'s OS/2 LAN Manager.

ANALYSIS

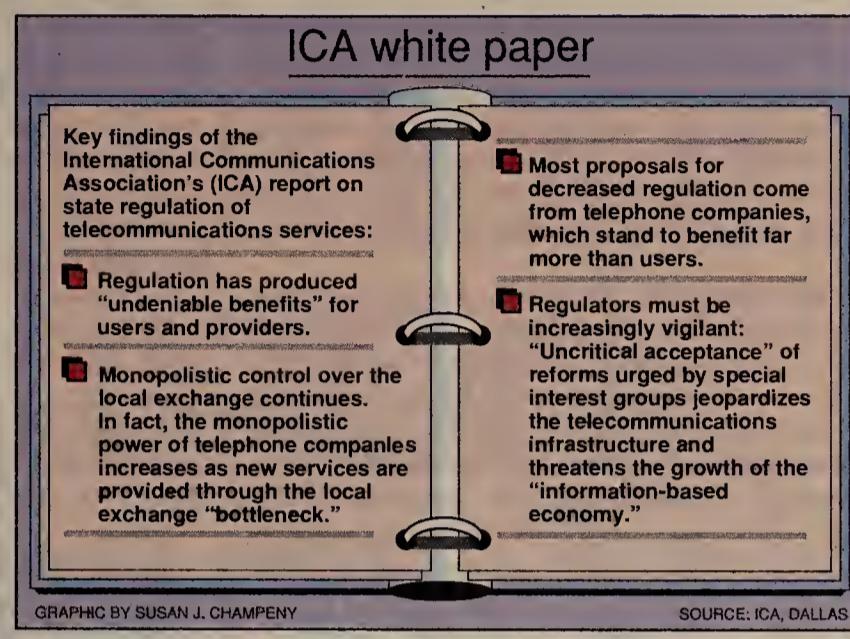
By supporting the efforts of both vendors, Apple will give its users two options: They can use NetWare today to tie into MS-DOS environments supported by Ethernet and token-ring nets, or they can plan to integrate the Macintosh into OS/2 environments.

Support for Novell's NetWare is a boon for network managers because it gives them a way to tie the Macintosh, and Macintosh nets, into local networks with DOS-based personal computers. Also, it opens up the Macintosh to a wealth of software applications.

On the other hand, LAN Manager stands out as one of the pos-

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ICA white paper



Key findings of the International Communications Association's (ICA) report on state regulation of telecommunications services:

- Regulation has produced "undeniable benefits" for users and providers.
- Monopolistic control over the local exchange continues. In fact, the monopolistic power of telephone companies increases as new services are provided through the local exchange "bottleneck."
- Most proposals for decreased regulation come from telephone companies, which stand to benefit far more than users.
- Regulators must be increasingly vigilant: "Uncritical acceptance" of reforms urged by special interest groups jeopardizes the telecommunications infrastructure and threatens the growth of the "information-based economy."

GRAPHIC BY SUSAN J. CHAMPEY

SOURCE: ICA, DALLAS

Barclays seeks wider role in global banking arena

Networks at heart of plan to become one of the most powerful financial institutions in the world.

By Jim Brown
New Products Editor

LONDON — Barclays Bank plc last week detailed plans to migrate its domestic backbone network to X.25 standards and replace stand-alone workstations in its 2,900 branch offices with local network-attached microcomputers.

The projects are the latest steps in Barclays' effort to expand its presence worldwide. The bank, which is rated the 14th largest in the world, is also building a global X.25 packet network to support communications among bank offices around the world.

Barclays plans to merge au-

tonomous bank operations in more than 80 countries into a single global banking system. "The bank's strategy is to become one of the top three global financial institutions," said Trevor Nicholas, director of information systems and resources for Barclays. "And to do that, you've got to be networked and you've got to have the whole thing running around the clock."

The backbone upgrade involves the replacement of the 20-year-old proprietary Barclays Integrated Network System (BINS) with a private X.25 network supporting IBM Systems Network Architecture protocols. Barclays

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NETLINE

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ICA urges caution in deregulatory efforts

Report criticizes telco-sponsored proposals, warns competition in local loop has not arrived.

By Barton Crockett
Senior Editor

WASHINGTON, D.C. — The International Communications Association (ICA) last week rebuked local telephone companies, charging them with pursuing regulatory reforms that are harmful to the nation's telecommunications users.

In a 28-page white paper delivered at a briefing here, the ICA said most proposals for deregulation in the local loop have come from telephone companies, not consumers.

The report urges regulatory officials to reject most of these initiatives, saying that competition in the local exchange has not arrived and may never exist.

The ICA is one of the country's largest user associations, representing more than 670 corporations, universities and government agencies.

The document, titled "Adapting State Regulation of Telephone Companies to Industry Change," praises the current regulatory structure as "an effective and resilient tool during the past century." It says current regulation has produced undeniable benefits for users and vendors.

If local carrier-inspired deregulatory reforms are adopted, "the widespread availability of

high-quality, low-cost telecommunications services — the cornerstone of America's information-based economy — will be seriously threatened," the ICA report warns.

The paper, which was mailed to state commissioners and legis-

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INSIDE



NTI's Don Peterson critiques IBM/Siemens pairing, page 7.

User dumps US Sprint in favor of MCI

By Paul Desmond
Staff Writer

SACRAMENTO, Calif. — The California Trucking Association (CTA) was expected to tell its 2,500 members yesterday it has signed on MCI Communications Corp. after abandoning US Sprint Communications Co. due to billing and customer support problems.

The MCI Express Network to be offered to the independent trucking companies in the trade group will improve transmission quality for members and cut costs, according to Stephen Sax, MIS director of the CTA. The network, detailed for CTA members in San Diego yesterday, could eventually generate \$500 million a year in revenue for MCI.

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Efficient networks help states do more with less

By Thomas Marsan
and Jeffrey Held
Special to Network World

Times are tough for state governments. Most states are facing sizable deficits with no relief in sight. Because of this situation, the last thing most state government budget directors want to see is increased spending on telecommunications. At the same time, experience has shown that networking can help govern-

ments work more efficiently.

State governments are already among the largest users of telecommunications services and equipment in the U.S. At

least 10 state governments spend more than \$50 million each year on telecommunications, and several spend in excess of \$100 million.

This level of spending places most state governments high on the lists of carriers and equipment

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INDUSTRY FOCUS

Debate intensifies as FCC price cap decision nears

Commission expected to implement price caps for AT&T, delay action on regional companies.

By Anita Taff

Senior Correspondent, Washington

WASHINGTON, D.C. — The battle over the Federal Communications Commission's price cap plan intensified last week, as commissioners, carriers and Congress attempted to iron out their differences before a meeting on the issue scheduled for today.

The FCC is expected to vote to implement price caps initially for AT&T, with implementation for the local exchange carriers to be delayed pending further investigation.

In a letter sent earlier this month to Rep. John Dingell (D-Mich.), chairman of the House Energy and Commerce Committee, FCC Chairman Dennis Patrick said he would advise the other commissioners to proceed with the plan for AT&T but to hold off on implementation for the local carriers.

While the plan has been scrutinized during a number of congressional hearings and has been the subject of numerous studies, there is still no consensus as to whether price caps would help or harm users.

Sources within and outside the FCC said it is possible the proposal will be pulled from the agenda at today's meeting because the FCC commissioners are so divided on the price cap issue.

The price cap proposal has

been highly controversial; everyone agrees that the stakes are high for telecommunications users.

Patrick has estimated that price cap regulation could save users \$1.6 billion during the first four years of implementation.

Bell Communications Research, Inc., the research arm of the seven regional Bell holding companies, has estimated that consumers will save \$5 billion in the first four years of price caps.

But the Consumer Federation of America has said that if price cap regulation had been in effect during the last decade, callers would have paid \$7 billion more for interstate services.

The price cap proposal would cap carriers' current rates and restrict future yearly rate adjustments to levels 3% less than the gross national product index, which measures the productivity of the U.S. economy as a whole. It would regulate the carriers' rates rather than their profits, as existing rate-of-return regulation dictates.

The initial price cap plan was introduced in August 1987 but was met by a barrage of criticism from users, carriers and Congress, who said the proposal contained too few details on how price caps would work. The plan was rewritten, and the new document, almost 300 pages long, was introduced in May 1988. □

X.400 to put price, service pressure on E-mail firms

By Bob Brown
Senior Writer

The interconnection of public electronic mail networks through X.400 will force providers to differentiate their E-mail offerings on price and service variety rather than on the size of their subscriber bases.

Although opinions vary on how quickly public E-mail networks will be linked via X.400 — a standard way of sending messages between computers on a store-and-forward basis — service providers unanimously agree that it will happen. Interconnection is good news for users, who will be able to send messages to subscribers on any interconnected public E-mail net.

But vendors have mixed feelings about interconnection.

Currently, providers with the most subscribers on their network have a competitive edge. But interconnection will blunt that edge, essentially opening one vendor's subscriber base to

other service providers. As a result, vendors will have to compete on price, quality and variety of services.

Recent news that AT&T is linking its AT&T Mail public E-mail network to British Telecommunications plc's Dialcom Electronic Mail network is the first evidence of interconnection among major providers in the U.S. ("AT&T, British Telecom to link messaging nets," *NW*, Jan. 23). The vendors agreed to link their networks to meet the requirements of the multimillion-dollar Federal Telecommunications System (FTS) 2000 contract.

Telenet Communications Corp.'s E-mail network is another candidate for domestic interconnection because its parent company, US Sprint Communications Co., is also an FTS 2000 contractor, E-mail vendors said.

Interconnection anticipation has also been spurred by an agreement among eight major

(continued on page 6)

Briefs

Tale of two switches. At the Communication Networks Conference and Exposition '89 in Washington, D.C. next week, AT&T is expected to unveil a new private branch exchange that merges the functions of its System 75 and System 85 PBXs. Analysts predict the switch will be made part of a broader AT&T Premise Product Architecture.

By merging the switches, AT&T is combining the best features of the System 75 and the System 85. For example, software options such as Integrated Services Digital Network Primary Rate Interface, which was available on the 400- to 32,000-line System 85 but not on the 40- to 800-line System 75, will likely be supported on the new switch.

HP delivers air mail. American Airlines, Inc. last week announced it has awarded an \$18 million contract to Hewlett-Packard Co. for hardware, software and services that will be used in an electronic mail network serving 14,000 American Airlines employees worldwide. As part of its Interact corporate networking project, American Airlines will install more than 135 HP 3000 minicomputers, NewWave windowing software and the DeskManager E-mail system.

Sears forms net unit. Sears, Roebuck and Co. in Chicago last week announced the formation of Sears Technology Services, Inc. to consolidate the data processing and telecommunications activities of the corporation. The new unit will oversee Sears' communications network, which is used for the firm's internal communications needs and mar-

keted to outside users through Sears Communications Co. Charles Carlson, vice-president of information systems and data processing for Sears Merchandise Group since 1981, was appointed president of Sears Technology Services.

Galileo opts for Net/Master. Galileo, a European airline reservation network consortium, last week said it has passed over IBM's NetView net management software in favor of Cincom Systems, Inc.'s Net/Master to manage the group's IBM Systems Network Architecture network. Cincom's Vicki Duckworth, senior Net/Master product manager, said Galileo was looking for software to help manage changes on the network and to track and resolve problems.

The Cincom software will be installed at Galileo's newly built switching center in Swindon, England. By next summer, the center will house six IBM 3090 Model 280 mainframes supporting a network of more than 9,000 IBM Personal System/2 Model 50 microcomputers throughout Europe.

AT&T plans SDN promo. At press time, *Network World* learned that AT&T is planning a promotional program designed to win new users for its Software-Defined Network service. AT&T has not yet filed details of the promotion with the Federal Communications Commission, but it could be similar to a promotion announced during the Super Bowl for Pro WATS, under which AT&T offered to pay installation and other charges for customers that switch to the service from another carrier.

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The only way most communications managers become involved with television is by turning on the TV after work. Few of them are responsible for purchasing or maintaining the technology to support business television.

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AT&T Announces A Historic Trans-Atlantic Crossing.

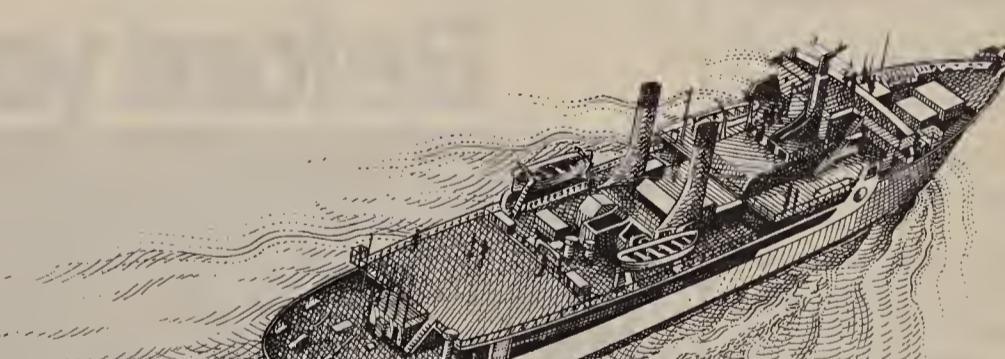
The completion of TAT-8.
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system between the U.S. and Europe.

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The right choice.

Vanderbilt scraps AT&T phone cards

By Bob Brown
Senior Writer

NASHVILLE — Vanderbilt University last week said it plans to dump 1,500 AT&T calling cards because many calls made with the cards are being carried by other, more costly carriers.

Ted Vagelos, assistant director of telecommunications at Vanderbilt, said \$3,200 of the \$9,000 worth of calls made by university cardholders here last month were billed by carriers other than AT&T.

Collect calls, calls from private pay phones or calls from telephones at sites using alternative operator services (AOS) companies are being routed by a variety of carriers, including AOS companies and competing long-distance companies, he said. Some of these companies charge two or three times as much as AT&T.

"Card users can no longer assume their calls will be carried by AT&T," Vagelos said. "Our users have no idea they are using a ser-

Users would rather dial a few extra digits than play Russian roulette with their telephone bills, said

MCI's Steve Gunderson.

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vice other than AT&T when they make collect calls or use their calling card."

Vanderbilt's most recent calling card bill included charges from National Telephone Services, Inc., International Telecharge, Inc. and US Sprint Communications Co., among other companies, Vagelos said.

An AT&T spokesman acknowledged that the company may lose Vanderbilt's calling card business because of the problem. The spokesman was expected to provide further details on the problem but did not do so before press time.

Vagelos said MCI Communications Corp. calling cards will likely be used in place of the AT&T cards.

He also said MCI will probably get the nod over US Sprint because MCI does not charge extra for calls made with a card in the customer's local calling area.

Calls made with MCI and US Sprint cards are always handled by those carriers because the companies require cardholders

to dial an 800 or special local number that automatically routes traffic to their nets, Vagelos said.

Ironically, a major reason given by calling card users for not switching to MCI or US Sprint cards in the past was that they had to dial extra digits, said Steve Gunderson, a major account executive at MCI in Nashville. Now these users would rather dial a few extra digits than play Russian roulette with their telephone bills, he said.

"AT&T used to say, 'Buy our card, and you don't have to think,'" Gunderson said. "That's not true anymore. The AT&T card is no longer so convenient."

The problem with AT&T cards may be exacerbated as a result of a recent ruling by U.S. District Court Judge Harold Greene. Greene ordered the regional Bell holding companies to end the practice of automatically routing all pay phone calls to AT&T. The RBHCs must give pay phone owners an opportunity to select an alternative carrier by mid-year.

For users of most AT&T calling cards, this means that calls from pay phones will be routed to the carrier designated by the owner of the premises where the pay phone resides. Vagelos said there are special dialing requirements to get around this.

MCI's Gunderson said he expects other calling card swaps to be triggered by Greene's action.

Vagelos said he has written to AT&T to suggest that it use an 800 number as its competitors do. According to an AT&T spokesman, who said he had no knowledge of the letter, establishing such an 800 number would be difficult for the carrier. □

Fibronics unveils interface that forges IBM/FDDI link

Device also offers IBM host access for LANs.

By Laura DiDio
Senior Editor

HYANNIS, Mass. — Fibronics International, Inc. last week introduced an interface that enables IBM mainframes to be channel-attached to a 100M bit/sec Fiber Distributed Data Interface (FDDI) network.

The FX8222 interface, the latest device in Fibronics' System Finex FDDI family, enables third-party local nets — including Ethernets — to access IBM hosts.

IBM currently offers no direct Ethernet connections into its Systems Network Architecture environment; the FDDI backbone will serve as a data conduit between the local nets and the IBM mainframes.

IBM also does not offer an FDDI-to-mainframe attachment. Instead, the company currently offers only local network channels extenders and other devices that run at a fraction of the 100M bit/sec rate that FDDI offers.

The FX8222 is a 19-in. unit that resides near the host and links the IBM mainframe channel to the FDDI network.

Specifically, it gives users a high-speed interface between IBM System/370 mainframes, or any system with a standard IBM block multiplexer channel, and an FDDI backbone net.

Additionally, the FX8222 will connect to other vendors' IBM-compatible mainframes, including Amdahl Corp.; Fujitsu Ameri-

ca, Inc.; Hitachi America, Inc.; and Siemens AG of Munich.

The FX8222 will not, however, initially provide users with connections between FDDI backbone nets and IBM's increasingly popular Application System/400 (AS/400) class of machines, according to Hal Spurney, Fibronics' vice-president of marketing.

"There is currently no specified, standard, high-speed, multiplexed channel connection for the AS/400," Spurney said. "We

Making FDDI affordable

The FX8222 uses Advanced Micro Devices, Inc.'s Supernet chipset, which began shipping last December. Use of the Supernet chipset in place of custom circuitry has helped the company cut the cost of its entire FDDI product line by about 40%, Spurney said. "The chipset is making FDDI affordable to a lot more users, and that will help the market grow faster."

Many users will elect to skip the 16M bit/sec Token-Ring and go directly to FDDI.

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have no idea if IBM will offer one because there are so many different configurations of AS/400s." The AS/400 machines range from low-end minicomputers to processors with near-mainframe capabilities.

When used in conjunction with KNET, Fibronics' Transmission Control Protocol/Internet Protocol software for mainframes, the FX8222 provides mainframe file and application access for all TCP/IP users connected via the FDDI backbone.

This combination also gives IBM 3270 terminal users access

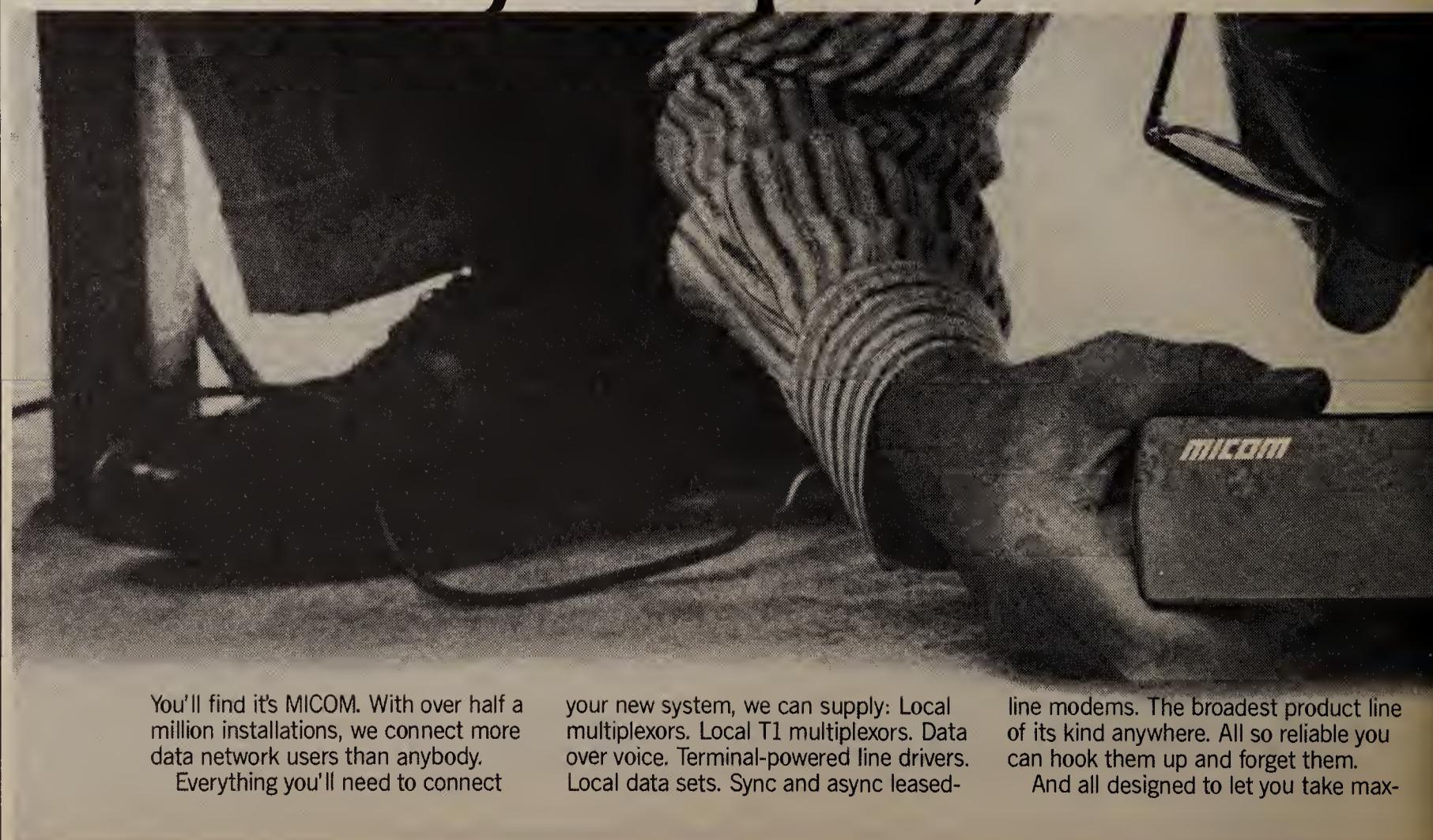
The FX8222 costs \$35,500. With an optional optical bypass switch, it costs \$38,400. This gives the network additional redundancy in case of failure.

"If we were still using the discrete device," Spurney said, "the FX8222 would probably cost about \$50,000."

Fibronics critics have accused the company of building a proprietary FDDI suite of products. Spurney disagreed.

The System Finex family, including the new FX8222, he said, fully conforms to all of the parts of the ANSI and International

Before you expand, see who's



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your new system, we can supply: Local multiplexors. Local T1 multiplexors. Data over voice. Terminal-powered line drivers. Local data sets. Sync and async leased-line modems. The broadest product line of its kind anywhere. All so reliable you can hook them up and forget them. And all designed to let you take max-

Standards Organization FDDI standards that have been defined thus far. It does not offer full FDDI support, as some software components of the standard remain undefined. Still, the FX8222 will provide users with the bandwidth of a 100M bit/sec backbone.

The FX8222 is suited for large corporate and government networks that transmit data in real time.

Many IBM SNA users are utilizing 4M bit/sec Token-Ring Networks and are just beginning to migrate to the 16M bit/sec Token-Ring.

But Spurney does not feel the 16M bit/sec Token-Ring will compete with FDDI products.

"Many large and even medium-sized users will elect to skip the 16M bit/sec Token-Ring and go directly to FDDI to use as their high-speed backbone," Spurney said.

Besides Fibronics, only one other vendor, San Diego-based IN-NET Corp., is close to announcing FDDI products.

At next week's Communication Networks Conference and Exposition '89 trade show in Washington, D.C., IN-NET will introduce a channel-to-channel interface for IBM mainframes on an FDDI backbone network.

Called the FiberTalk 3000 Channel Interface Unit, the device will enable users to locate their channel interfaces up to 1.2 miles away from the mainframe, according to John Mazzaferrro, IN-NET's director of marketing. The extra distance is especially important to users that have departments located on different floors of a building or in remote locations. □

User dumps US Sprint for MCI

continued from page 1

The announcement of Express Network marked the end of a three-month trial of MCI's Vnet virtual network service, which is the foundation of Express Network, and the end of a 3½-year relationship with US Sprint.

Sax, who once sat on US Sprint's National Accounts Users Group Billing Subcommittee, said the group gave up on US Sprint because the carrier was unresponsive.

US Sprint twice switched the CTA's account between its national and regional divisions and left the CTA without an account representative for several months, he said.

"I think we gave them ample opportunity to perform and provide us with what we needed," he said.

The MCI network replaces a network consisting of direct-dial, WATS and leased lines provided by US Sprint under a 30-month contract that expired Nov. 30.

The new Vnet-based Express Network will link trucking companies with drivers and dispatching offices as if they were all on a private net. It will support voice and dial-up data communications and allow calling card access for cellular phones, Sax said.

Like the older US Sprint Express Program network, the new net promises to save time, money and fuel by enabling dispatchers to reduce the number of empty trucks on the road by giving drivers last-minute cargo pickup instructions.

Express Network will provide higher quality services at a lower cost and could eventually support

direct access from cellular switches, Sax said.

The Vnet network will be deployed over the next 18 months throughout California, where most CTA members are based, and then nationwide, Sax said. "It is anticipated that when we reach our nationwide rollout, we could be generating revenue [for MCI] in excess of \$500 million annually," he said.

The CTA estimates it will save 10% to 40% with Vnet, as compared with the Express Program, and up to 10% more than the maximum savings expected from a similar US Sprint service, which the CTA tested before choosing MCI.

US Sprint gets first shot

The CTA gave US Sprint the first shot at the business early last year but decided to ditch the carrier after a 90-day trial of its Virtual Private Network (VPN) offering uncovered billing, service and support problems, Sax said.

The CTA was one of many US Sprint customers experiencing billing problems at the time. ("FCC chides US Sprint for ongoing billing problems," NW, Aug. 1, 1988).

"We're the first to admit we had problems; that's been well-publicized," a US Sprint spokesman said. "It was [a result of] US Sprint's growing pains since it was such a young company. Those are now fixed."

But Sax said that even in September 1988, well after US Sprint declared its billing problems were over, bills arrived two months late.

In addition, the carrier promised to provide billing information on magnetic tape that the CTA could use to generate bills for members.

"Their magnetic-tape billing was simply a call-detail tape" that did not include taxes and termination charges, Sax said.

Another problem with US Sprint's VPN was that the carrier wanted CTA members to access the virtual network using Centrex lines so it could identify users. This was deemed unacceptable because it would have built in 60- to 90-day delays typically required to order Centrex lines, Sax said.

Tim McKinley, VPN product manager for US Sprint, said the company provides regular switched access to VPN by issuing customers autodialers that dial into the network and identify the user. But, according to Susan Rueppel, virtual private network manager for CTA, that service carried a \$1 per-call charge that would have nullified proposed savings.

McKinley said US Sprint tested a service last summer, scheduled to debut this year, that would provide switched access to its VPN without the autodialer.

MCI can provide switched access for the 98% of CTA members that are located in equal access areas.

US Sprint also could not provide the 10-digit to seven-digit conversion that the CTA wanted and that MCI is now providing, Sax said. Software-defined networks operate on a seven-digit dialing scheme, but the CTA wanted its members to be able to use the same 10-digit numbers to which they were accustomed. □

StrataCom fast-packet mux debuts

By Wayne Eckerson
Staff Writer

CAMPBELL, Calif. — StrataCom, Inc. last week unveiled a low-end T-1 multiplexer based on fast-packet technology that the company said is suited for regional and branch offices within corporate networks.

The introduction of the IPX 12 FastPacket Bandwidth Management System gives StrataCom a full line of T-1 multiplexers, all of which support the same software architecture. With its unified software scheme, StrataCom can provide customers with an economical migration path, said Richard Moley, StrataCom president.

T-1 for small users

Declining prices have made T-1 services increasingly attractive for small network users at the regional and branch-office levels, Moley said. The IPX 12 will provide those users with the T-1 bandwidth they need, but it will not have the power and trunk-line capacity of high-end models.

The IPX 12 has 12 card slots that support two processor cards and up to nine voice and data

DDeclining prices have made T-1 services increasingly attractive for small network users at the regional and branch-office levels, Moley said.

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ports, as well as one digital interface group that supports two T-1 trunks. Data ports support RS-232, RS-422, RS-449 and V.35 interfaces.

The product is based on StrataCom's FastPacket technology — introduced in 1986 — which offers twice as many voice connections as circuit-switching technology, according to David Owen, StrataCom's vice-president of marketing.

The company's IPX fast-packet multiplexers provide 96 toll-quality voice connections per T-1 trunk. The IPX also provides 10-to-1 data compression rates at speeds up to 64K bit/sec. IPX systems automatically adjust compression rates when transmitting facsimile and high-speed modem data.

The IPX 12, available now, will be demonstrated at the Communication Networks Conference and Exposition '89, to be (continued on page 37)

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AT&T asks FCC to keep pricing for FTS 2000 net under wraps

Users, rivals say request is ploy to underprice govt. services.

By Anita Taff
Senior Correspondent, Washington

WASHINGTON, D.C. — In an unusual move, AT&T last week asked the Federal Communications Commission to keep secret the prices it will charge the government for services under the Federal Telecommunications System (FTS) 2000 contract.

The long-distance carrier made the request when it filed a plan to offer FTS 2000 under Tariff 16, which would allow AT&T to provide custom network deals to government agencies under certain circumstances. Usually, a tariff must include pricing information to show that the service is not priced below cost.

If AT&T is allowed to keep its pricing information secret, it could underprice the FTS 2000 services, forcing other customers to subsidize the cost of the government network, claimed user associations and rival carriers that oppose the AT&T request.

"Other customers have a right to know AT&T's prices so long as it is a regulated common carrier," said Ken Phillips, chairman of the Committee of Corporate Telecommunications Users, an association representing some of the nation's largest telecommunications users.

Phillips said the association will proba-

bly file a letter of protest but won't file an official motion asking the FCC to reject the tariff.

Charles Helein, counsel for the Alternative Telecommunications Carriers Association, also objected to AT&T's request to keep its pricing information secret. "This is further evidence that they have succeeded in deregulating themselves," he said. "They have replaced the FCC as the [regulatory agency], and they're doing what they want."

He expressed concern that if the FCC allows AT&T to cloak its prices for one customer, it may open the way for the carrier to keep prices for other customers secret.

AT&T downplayed such concerns in its filing, claiming that because the FCC will receive the FTS 2000 pricing information, such discriminatory pricing will be prevented.

AT&T said it would also agree to make the information available to attorneys of interested parties on the condition that they not disclose it to their clients. The carrier said it is not necessary to give the pricing information to other ratepayers.

"Other users of telecommunications services have no legitimate need to know those rates because the FTS 2000 service is

(continued on page 35)

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X.400 to put pressure on E-mail firms

continued from page 2

public E-mail service providers to link their nets via X.400 in a pilot test ("X.400 poised on the brink of broad user acceptance," NW, Jan. 23).

AT&T, a member of that E-mail vendor group, said it has supported linking public E-mail networks via X.400 since February 1986, when it introduced AT&T Mail.

This support is not surprising because AT&T was a latecomer to the market. Interconnection is one way for AT&T to catch up to its competitors that have larger subscriber bases, said George Cunningham, division manager of AT&T Mail.

Cunningham said interconnection of public networks will make services more attractive to users and will spur growth in that market. Interconnection will also force vendors of private E-mail systems to support X.400, he said.

"Sure, vendors will have mixed feelings toward interconnection. But taking away one another's installed base is not what's at issue here," said Brian Gaylord, vice-president of marketing for Western Union Corp.'s Business Services Division. "The real issue is all those users who are not part of the installed base."

Interconnection means fiercer competition, according to Eric Arnum, editor of the "Electronic Mail and Micro Systems" newsletter in New Canaan, Conn.

"It'll be a lot like the long-distance market, with companies reacting to every move made by their competitors," Arnum

said. "But unlike the long-distance market, where you've only got a few major companies, there are eight or nine major E-mail vendors."

As basic E-mail transport becomes more of a commodity, vendors of public E-mail services will rely on value-added services to attract new customers and retain current ones, Gaylord said. Western Union last week announced a new offering called OfficeAccess that is an example of such value-added services, he said.

E-mail system vendors that develop customized service offerings attractive to various vertical industries will increase their customer base, said Mike Sprayberry, director of integrated network solutions for CAP International, Inc., a Norwell, Mass.-based market research and consulting firm. For example, Sprayberry cited order entry as a service that a vendor could offer via customized software.

Price wars

Vendors acknowledge that interconnection will drive E-mail prices lower. But they say a price war is years away.

MCI Communications Corp.'s announcement two weeks ago of price cuts and new pricing options for its E-mail service ("MCI discounts E-mail by up to 75% to get big users," NW, Jan. 23) will draw competing vendors' attention but probably will not push them into matching price cuts, said Mike Cavanagh, executive director of the Electronic Mail Association, a Washington, D.C.-based trade group for users and vendors.

"Price will take a while [to become a factor]," AT&T's Cunningham agreed. "I think the industry is still in a big growth curve."

A spokesman for Dialcom said excitement over widespread interconnection of public E-mail networks may be premature, since the market is not even close to being saturated. Some people are getting "interconnection crazy," he said.

"Dialcom is not supportive of interconnection for interconnection's sake," the spokesman said. "We'll pursue further interconnection when customers say they need it."

Nynex to beta test metro-area net products

By John Cox
Senior Editor

WHITE PLAINS, N.Y. — Nynex Corp. last week announced plans to test a high-speed data net using prototype products that conform to the evolving IEEE 802.6 Metropolitan Area Network standard.

Fiber-optic-based metro nets will initially operate at 45M bit/sec, providing a high-speed, highly reliable option for businesses that need to move large amounts of integrated voice, data and video signals within metropolitan areas.

QPSX Communications Ltd. of Perth, Australia, will supply prototype metropolitan net nodes for the Nynex trials, which will demonstrate how metro nets can be used to link local networks. The QPSX nodes will be placed at user sites to support Ethernet and token-ring local nets.

The dual-fiber metropolitan net backbone, which encompasses customer premises equipment and telephone company central office switches, will enable the local networks to participate in what appears to be a single, large local net.

According to Nynex, the trial will focus specifically on developing a network management and administrative system to support commercial services, such as the proposed switched multimegabit data service (SMDS). The regional Bell holding companies envision SMDS as a commercial service for interconnecting private local nets over a public facility. Nynex officials were unavailable to provide additional details.

(continued on page 39)

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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

Beginning in April, the Indonesian government will spend \$2.9 billion to add 1.4 million new telephone lines. As part of a longer term project to support economic growth and increased international trade, the government will spend \$4.5 billion more for a digital telecommunications network.

People & Positions

The National Telecommunications Network, a partnership of five regional telecommunications companies, recently appointed **Bruce Swander** director of marketing. Swander's responsibilities will include market penetration of national accounts and establishing a federal government sales office.

Swander has held various sales management and marketing positions within the communications industry over the past 17 years.

Larry Jernigan, president of Votrax, Inc., a maker of voice-processing systems, recently was named to the additional post of chief executive officer.

Votrax also announced that **Kenneth Hiltz** was appointed vice-president and chief financial officer. Hiltz will be responsible for all financial and administrative aspects of the Troy, Mich.-based company.

Franklin Telecommunications Corp., a manufacturer of data communications products and distributor of personal computers and peripherals, recently announced that its Datacom Division appointed **Kirk Wrigley** director of U.S. sales.

Wrigley will be based in Washington, D.C. and will be responsible for expanding the sales force as well as coordinating all U.S. sales efforts.

New IBM service program simplifies billing, ordering

Users can also get an estimated billing option.

By Bob Brown
Senior Writer

WHITE PLAINS, N.Y. — IBM last week announced a new service program that allows users to order all IBM maintenance, professional and network services through one contract and be charged for maintenance services on a single bill.

IBM's ServicePlan promises to simplify the task of choosing from IBM's 25 different service offerings by allowing users to order them on one form. Offerings include maintenance services and related payment options; professional services such as application development and project management; and use of the IBM Information Network.

Users will be charged for professional and network services through separate bills and can take advantage of a single-invoice, estimated billing option for all maintenance services.

Under the estimated billing option, IBM and the user draft an

estimate of projected service needs based on the number of machines to be maintained, an IBM spokesman said. The user then pays a monthly service bill based on that estimate.

The option can help users cut administrative costs associated with reconciling service charges for multiple computers and net devices, the spokesman said.

Estimated billing will be made available to all users as part of a phased implementation throughout the year.

IBM also eliminated the requirement that users must have an IBM processor or Rolm CBX private branch exchange to qualify for Network Support, formerly called Telecommunications Services, Network Support. Through its Network Support program, which was announced under its former name in September 1988, IBM offers users service on IBM equipment, and it coordinates service on non-IBM network equipment, a spokesman said.

INDUSTRY BRIEFS

As expected, AT&T last week reported major losses for the fourth quarter and the year.

AT&T announced on Dec. 1 that it would write off older network equipment and take other related charges to speed the modernization of its long-distance network ("AT&T faces first annual loss due to \$6.7b charge," NW, Dec. 5, 1988).

The carrier reported a net loss of \$3.34 billion for the three months ended Dec. 31, down from a profit of \$498 million for the comparable period last year. Revenue increased to \$9.21 billion for the fourth quarter, up from \$8.65 billion for the corresponding quarter the year before. AT&T reported a loss for the year of \$1.67 billion, down from earnings of \$2.04 billion in 1987. Revenue for 1988 totaled \$35.21 billion, up from revenue of \$33.77 billion in 1987.

Without the charge, AT&T said it would have earned \$2.27 billion for the year and \$593 million in the fourth quarter.

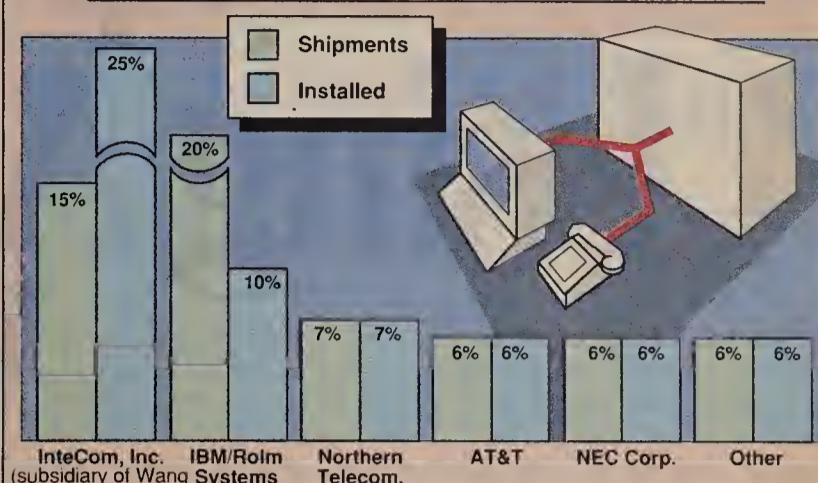
Racal Electronics, plc last week announced the acquisition of **Quanta Communications Systems, Inc.**, an international fiber-optic systems supplier based in Anaheim, Calif. Terms of the transaction were not disclosed.

Prior to the transaction, Quanta Communications Systems was a Racal Electronics associate company, with about 30% of its outstanding stock owned by Racal Electronics, which is based in Bracknell, England. Quanta Communications Systems will now do business as Racal-Quanta.

X/Open Co. Ltd., a San Francisco-based consortium of vendors committed to supporting a common application environment, last week announced that seven more companies have joined the consortium.

Apollo Computer, Inc., **Hitachi, Ltd.**, **NEC Corp.** and **Prime Computer, Inc.** have joined as full corporate members. **Arco Oil and Gas Co.** and the **Royal Dutch/Shell Group of Cos.** also joined the X/Open User Council. **Ashisuto**, a Japanese agent for many Western software firms, joined the group's Independent Software Vendor Council.

Integrating voice and data on PBXs



Figures are for 1988 and represent the percentage of a vendor's installed or shipped lines that are integrated voice/data.

GRAPHIC BY SUSAN J. CHAMPEY SOURCE: THE EASTERN MANAGEMENT GROUP, PARSIPPANY, N.J.

NTI VP talks about IBM/Siemens threat

IBM's sale of Rolm to Siemens represents both a challenge and an opportunity for Northern Tel.

By Bob Brown
Senior Writer

NEW YORK — Northern Telecom, Inc. last week broke its silence on IBM's December announcement that it will sell its Rolm Systems Division to Siemens AG.

After the IBM/Siemens news last month, Northern Telecom officials declined to comment beyond a brief prepared statement. But at a briefing here last week, Donald Peterson, Northern Telecom's group vice-president for Meridian Business Systems, said the emergence of Siemens as a larger player in the U.S. market is a threat to all private branch exchange vendors, including Northern Telecom.

"Siemens is as formidable a competitor as IBM in terms of corporate resources and technological capabilities," Peterson said.

However, he said Northern Telecom and its U.S. counterparts now have a great opportunity to capture existing Rolm customers that are planning PBX purchases — at least until Siemens figures out which PBX products it will make, sell and support. Rolm users have already expressed confusion over the proposed agreement, wondering if Siemens will sell both Rolm and its own switches, or discontinue some products ("IBM/Siemens deal leaves some Rolm users worried," NW, Dec. 19, 1988).

Developing a migration strategy for the Siemens-made, low-end Saturn and high-end Hicom switches, as well as for the mid-range to high-end, Rolm-made 9751 switches "is a very serious product issue," Peterson said. Siemens cannot afford to support

all the products, he said.

Siemens has not disclosed its plans regarding which products it will support.

Last month, IBM said it will sell its Rolm product development and manufacturing facilities to Siemens, which created a new unit called Rolm Systems, Inc. to oversee those operations ("IBM, Siemens carve up Rolm operations," NW, Dec. 19, 1988). IBM and Siemens have agreed to jointly market products built by the Rolm Systems Division through a newly formed unit

Siemens is as formidable a competitor as IBM," Northern Tel's Peterson said.

▲▲▲

called Rolm, which will also provide support for current Rolm customers.

So far, despite user grumblings, no large Rolm users have jumped ship to Northern Telecom as a result of the IBM/Siemens agreement, which is expected to be finalized soon, Peterson said.

"But that's not because we haven't asked them to," he said.

"I think both IBM and Siemens are credible enough players that users aren't going to flee in terror from this," Peterson said. "If [IBM and Siemens] choose to put the money and time into it, they can solve this problem."

But users must have their (continued on page 36)

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Worth Noting

"It's amazing how much interest is developed in ISDN when a company finds out that its competitors have developed ISDN applications and plan to use the technology."

Scott Beale Jr.
Senior engineer
Aeronautical Radio, Inc.
Annapolis, Md.

Carrier Watch

Teleconnect Co. was recently awarded a \$60 million contract from Iowa Public Television for a statewide, two-way audio and video fiber-optic network.

Teleconnect beat out AT&T and Northern Telecom, Inc. to win the contract, which calls for construction of a fiber backbone linking 15 regional sites and three state universities to public television studios outside Des Moines.

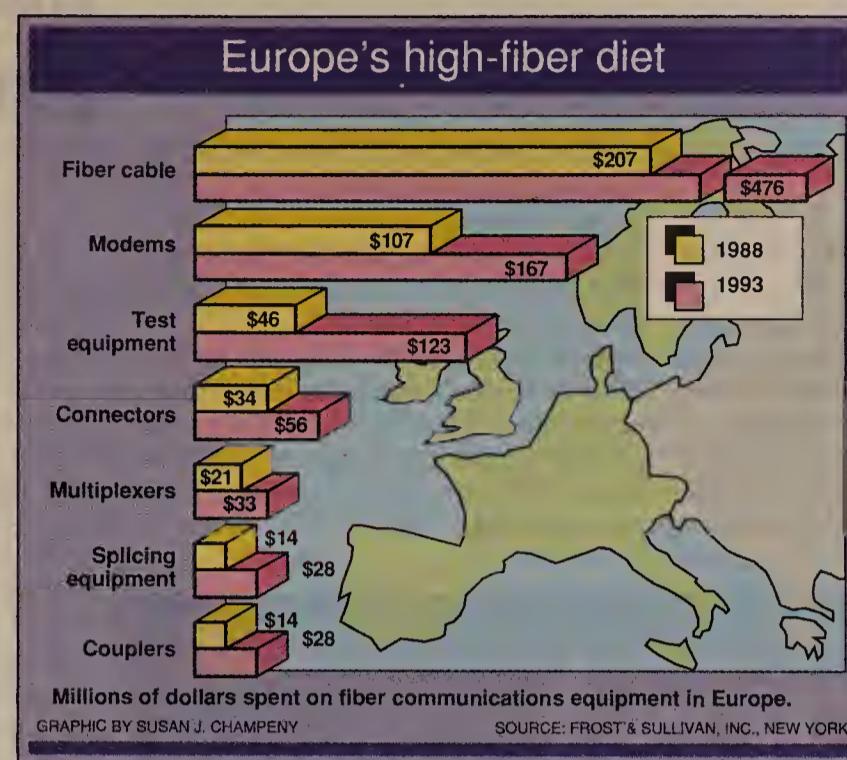
The network is expected to provide educational programming for elementary and secondary schools, private colleges, libraries and possibly businesses, according to Teleconnect.

US West, Inc. recently announced the completion of a \$115 million, three-year project, during which the company installed digital central office switches in 158 rural locations in Oregon, Idaho and Washington.

The regional Bell holding company replaced existing electromechanical switches with Northern Telecom, Inc. DMS-10 and DMS-100 digital switches.

The central offices can now provide customers with features such as call waiting, call forwarding and three-way calling.

US West now has digital switches in 27% of its central offices and provides equal access to 87% of its 11 million access lines. □



David Systems gets \$7m investment for ISDN R&D

PaineWebber investment to spur development.

By Bob Wallace
Senior Editor

SUNNYVALE, Calif. — PaineWebber Development Corp. last week signed a \$7 million research and development agreement with David Systems, Inc., which will use the stake to add ISDN capabilities to its switch and enhance its local network product line.

Under the 10-year agreement, PaineWebber Development, the New York-based venture capital subsidiary of PaineWebber Group, Inc., will bankroll the development of Integrated Services Digital Network-compatible products and faster, multivendor local network products.

"The investment by PaineWebber will enable us to do a great deal more R&D over the next 30 months than we would normally be able to finance using our own resources," said newly named David Systems President and Chief Executive Officer Henry Nothhaft.

The PaineWebber Development money will be used to develop an ISDN Basic Rate and Primary Rate Interface for the David Information Manager, a stand-alone voice/data switching system.

The Information Manager supports simultaneous transmission of digitized voice, asynchronous data and signaling data over unshielded twisted-pair wire. It can be used in conjunction with Centrex service or a variety of private branch exchanges.

A single Information Manager can support a maximum of 120 David-Set telephones at distances up to 2,000 feet. Data connections are established over the same twisted-pair wire used to

support the telephone sets.

The company said it would also improve the switch by replacing the device's eight-bit Intel Corp. 80186-based microprocessor with a 12-bit 80386 microprocessor.

The faster Information Manager will be rolled out in June, and the two ISDN interfaces are slated to be available in the first quarter of 1991, Nothhaft said.

The company will also use the PaineWebber Development money to round out its twisted pair-based Ethernet local network product line.

ExpressNet LAN, announced last September, is a 10M bit/sec Ethernet local net that consists of a hub and media access units, and can support as many as 12 users.

The enhanced ExpressNet LAN will support token-ring networks that run on twisted-pair wire at 4M bit/sec and 16M bit/sec. David Systems is funding development of a smaller hub, while PaineWebber Development will bankroll creation of the high-end hub, Nothhaft said.

ExpressNet LAN enhancements, which will increase network management and testing capabilities, will be rolled out beginning in the second quarter of this year and extending into 1990. The system is sold only by value-added resellers, including Brown & Associates, Inc. and Orion Network Systems, Inc.

David Systems products are distributed by Ameritech Communications, Inc., Ameritech's national marketing subsidiary. Ameritech Communications distributes the Information Manager through its unregulated equipment subsidiaries and through a national direct sales force. □

Nice guys refuse to finish last in ISDN

When AT&T took its new technology elsewhere, Nice Corp. found a way to implement it alone.

By Bob Wallace
Senior Editor

OGDEN, Utah — Passed over as the first user of AT&T's Integrated Services Digital Network service, Nice Corp. looked on helplessly as the carrier provided the new service to one of the firm's largest competitors.

AT&T's decision drove the 2,000-agent telemarketing company to implement ISDN in its private voice/data network — a move that has already saved Nice several million dollars in leased-line costs.

"We were approached by AT&T three years ago about participating in their first ISDN trial. We told them we'd love to be the first user, but we didn't think about the vendor politics surrounding such a move," said Richard Clements, telecommunications manager and engineer for Nice, which is based here.

The firm uses Northern Telecom, Inc. private branch exchanges throughout its voice/data network. "AT&T wanted its first ISDN user to be an AT&T

PBX user, not a company with Northern Telecom switches. They had to hook ISDN to [an AT&T] System 85 first," Clements said. "It makes good political sense."

Although this opportunity was lost, Nice was still interested in implementing ISDN. Then it received a second blow.

When AT&T released its 18-city 1988 ISDN Primary Rate Interface deployment plans early last year, Salt Lake City, the closest city to Nice with an AT&T 4ESS that could have been upgraded, was not on the list. Phoenix, the home of American Express Travel Related Services Co. (TRS), was on the list.

"If we were in Phoenix, we'd be fine. But AT&T has not yet delivered ISDN to Salt Lake City," Clements said. Nice's rival, TRS, became AT&T's first commercial ISDN user when it kicked off a three-month test of the service on Aug. 1, 1988.

"We wish AT&T would introduce ISDN in this area," Clements

(continued on page 10)

WASHINGTON UPDATE

BY ANITA TAFF

Bell Atlantic sings the blues. Bell Atlantic Corp. claims it will cost an additional \$2 million to provide Pennsylvania customers with a proposed gateway service, due to a ruling last week from U.S. District Court Judge Harold Greene.

The company had asked for permission to use one computer to provide gateway services for multiple local access and transport areas in Pennsylvania. Under the Bell Atlantic plan, customers would dial into local packet assembler/disassemblers, which would route the calls to a central computer located in a Philadelphia LATA.

MCI Communications Corp. and other critics of the plan argue that such an arrangement constitutes interexchange service, which the regional Bell holding companies are prohibited from offering.

Greene decided that Bell Atlantic's gateway plan would violate the prohibition on interexchange services. Even though local PADs are involved in the system, Greene said the central computer "is the keystone of the proposal," and he added that the computer would be providing information services across LATA boundaries.

As a result of the ruling, Bell Atlantic will have to install a computer in each of the five LATAs in Pennsylvania instead of one central computer. A Bell Atlantic spokeswoman said the installation of four additional computers will drive up costs by as much as \$2 million and delay implementation of the service by six to nine months.

The company issued a statement after Greene's decision saying customers in less populated areas will be the big losers

(continued on page 10)

Nice guys refuse to finish last in ISDN

continued from page 9

said. "We're waiting for it, and our ISDN-compatible PBX is ready to go."

But instead of waiting for AT&T, Nice set up a Primary Rate Interface link between its SL-1 here and a second PBX in its Provo, Utah, facility 90 miles away.

Both of the SL-1s were equipped with Northern Telecom's Primary Rate Interface, a Primary Rate Interface Circuit Pack and a D-Channel Handler Interface. The two sites were linked with a T-1 line leased from US West Communications, Inc.

The SL-1s use a single signaling channel on the T-1 line to set up voice and data calls between the PBXs over the remaining channels. Traffic from 120 asynchronous

terminals in the Provo office is multiplexed onto four 64K bit/sec channels, then passed through the SL-1 and onto the Primary Rate Interface link.

The SL-1 here receives the data and passes it on to multiplexers that break the 64K bit/sec data stream back down into 9.6K bit/sec or 19.2K bit/sec channels. The data is then fed into Nice's asynchronous host.

"By setting up and using the link, we gain experience with the [Primary Rate Interface] and [Primary Rate Interface] software and hardware," Clements said.

About 65% of all data transmitted outside corporate headquarters travels over the 90-mile Primary Rate Interface link.

"Before we set up [the Primary Rate Interface link], we were paying about \$5,000 a month for each 9.6K bit/sec leased line

between the two sites. We will save several million dollars each year by using the link in place of those lines," Clements said.

The resulting increase in bandwidth means faster response times for telemarketing agents in Provo who extract customer data files from Nice's mainframe here.

"We'll also be able to process more calls and decrease the time spent on each order," Clements said.

This is particularly important because Nice does not queue up callers who do not reach an agent on their first try.

"It's our corporate policy not to queue callers. We don't want them to think no one's home," Clements said. "We keep the number of callers that get busy signals low because we have almost as many stations as we do trunks." □

Workers punch time clock over phone lines

By Bob Wallace
Senior Editor

JACKSONVILLE, Fla. — The Baptist Medical Center here recently developed a computer program using InteCom, Inc.'s Open Applications Interface (OAI) that enables hospital employees to use their telephones to clock in and out of work.

The time-keeping program runs on an IBM Personal System/2 and uses InteCom's OAI to interface to an InteCom IBX S/80 switch, according to Janet Boling, strategic planning manager for InteCom.

OAI defines a software interface to an IBX board that simplifies the development of applications that merge the functions and features of IBX switches with computer and voice-processing applications. The interface makes it possible to pass control signals between the private branch exchange and the adjunct computer.

Instead of punching a clock, Baptist Medical Center's 1,200 employees now use their telephones to enter their employee and personal identification numbers when they arrive at work.

The IBX recognizes the digits as part of an OAI application and passes the digits over an RS-232 link to the computer. The processor checks both items against employee files in its data base. If the numbers match, the computer stamps the time of the transaction and sends it on with others to the medical center's employment department, which puts together the payroll.

If the number entered is invalid, the IBM Personal System/2 uses a voice accentuator to tell the user the number is incorrect. A printer attached to the computer produces exception reports that list unsuccessful attempts to check in or out of work, Boling said. "Most of our IBX customers anticipate having an application that will need OAI but don't have a specific one in mind," Boling said. OAI is sold as an option with the IBX. She declined to say how many users have bought OAI since it became available in mid-1987. □

Washington Update

continued from page 9

because there may not be enough demand to justify installation of a separate computer. "This kind of burden serves no public purpose," said Gray Collins, senior vice-president of external affairs at Bell Atlantic.

PTAT System hires Bennis.

Robert Bennis, former director of the International Communications Association's telecommunications public policy committee, has joined PTAT System, Inc. as a senior marketing adviser and consultant.

PTAT System, based in McLean, Va., is currently installing a private transatlantic fiber-optic cable, PTAT-1, that is scheduled to be completed in mid-1989. Cable & Wireless PLC is a partner with PTAT System in the PTAT-1 project.

Bennis will travel extensively to introduce users to the capabilities of PTAT-1 and discuss how the cable can be used as part of a corporate telecommunications strategy. □

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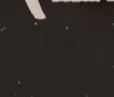
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Worth Noting

"Now all network equipment comes with net management capabilities. Users are saying, 'I've got too much of it.' There are lots of different [management] systems. It's contributing to the complexity."

James Herman
Principal
Northeast Consulting
Resources, Inc.
Boston

Data Packets

GSI-Danet, Inc. recently announced a new family of software development products designed to create applications that conform to the International Standards Organization's Open Systems Interconnection protocols.

The OSI Product Development Support System will let application developers analyze and test OSI-compliant software much earlier in the development process than has been possible before, according to GSI-Danet. Testing software during development, instead of after, will make it easier and less expensive to change.

The OSI model is a reference structure defining communications protocols that, when supported in hardware and software, allow equipment and applications from different vendors to work together on a network.

The OSI Product Development Support System comprises several software packages that let developers design OSI software in modular form and test it for OSI compliance before integrating the module into the final application.

Prices start at \$32,000 for the software, which is available now.

GSI-Danet is located at 1850 Centennial Park Drive, Suite 300, Reston, Va. 22091, or call (703) 758-0077. □

Sync's PAD handles mix of communications protocols

By John Cox
Senior Editor

LOS ANGELES — Sync Research, Inc. recently announced an X.25 packet assembler/disassembler that supports multiple communications protocols.

The Network Access Controller (NAC) enables customers to interconnect different sets of terminals and hosts, each using different communications protocols, over a common X.25 packet-switched backbone net.

Users can also keep tabs on clusters of NACs with a net management package called SyncView, according to Sync Research officials.

Last week, the company disclosed that AT&T has ordered nearly 1,000 NAC units, which it will use in-house to link almost 42,000 synchronous terminals to multiple hosts attached to AT&T's nationwide packet net.

The NACs will be managed through SyncView, which has been designed to work as a fully automated subsystem linked to a higher level net management system, in this case, AT&T's.

The NAC is attached to IBM host communications controllers and to 3270 terminals in both Systems Network Architecture networks and the older Binary Synchronous Communications networks. It also supports asynchronous hosts and terminals.

The multiprotocol NAC lets SNA, BSC and asynchronous terminals connect to both SNA and BSC host applications, according to Gregory Toussaint, vice-president of sales and marketing for Sync Research, based here.

Besides providing access to different host applications, the NAC supports a common user interface and as many as eight host sessions on each terminal. Users can hotkey between applications without having to log off from one host and onto another.

The NAC supports from four to 20 ports, each of which can be assigned a different line protocol. Finally, the NAC's built-in asynchronous-to-3270 terminal emulation lets microcomputers and many asynchronous terminals act like IBM synchronous devices.

Available now, the prices for NAC begin at \$5,880.

Toussaint said Sync Research is not competing in the low-end, asynchronous PAD market. Synchronous products are neither common nor inexpensive. "There's not much out there under \$4,000," he said.

The company plans shortly to release a PAD supporting SNA's Synchronous Data Link Communications protocol and others.

Sync Research is located at 13891 Newport Ave., Tustin, Calif. 92680, or call (714) 669-8020. □

Newbridge mux supports up to 24 voice channels

Mux links sites to T-1 backbone using 56K lines.

By Paul Desmond
Staff Writer

HERNDON, Va. — Newbridge Networks, Inc. recently announced a new model for its MainStreet multiplexer line that the company said can tie low-volume sites onto a T-1 backbone using narrow-band and fractional T-1 circuits.

The 3612 Mainstreet Narrowband Multiplexer can support four aggregate channels ranging from 56K bit/sec digital data service lines to fractional T-1 links of up to 512K bit/sec each. The new multiplexer is compatible with Newbridge's larger MainStreet T-1 multiplexers and is supported by the same 4602 MainStreet Network Management system that supports those multiplexers, the company said.

"Many of our customers have field offices that don't justify their own T-1 but need integrat-

tion into the corporate network," said Peter Madsen, Newbridge's president.

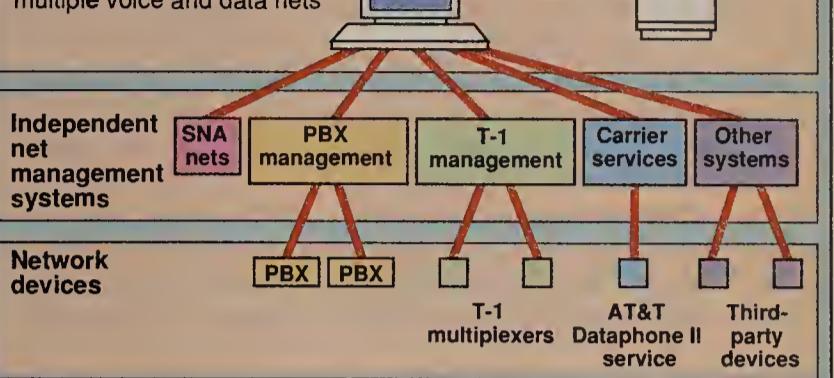
The 3612 with 56K bit/sec lines is compatible with the T-1 node so that almost every site can be connected directly to the digital backbone. This could enable more than 1,000 nodes to be connected in one network, he added.

Rather than require a similar multiplexer on each end of the connection, the 3612 can work with Newbridge's 3600, 3624, 3630 and 3645 MainStreet T-1 multiplexers or its 2600 series of data termination units (DTUs), said Jim Michaels, manager of product marketing for the company. The larger T-1 node can terminate or switch individual low-speed data channels or compressed voice channels from a single aggregate channel, he said.

(continued on page 12)

Integrated network management

AT&T's Integrator: a single point of control for multiple voice and data nets



GRAPHIC BY SUSAN J. CHAMPEY

SOURCE: AT&T, BASKING RIDGE, N.J.

Integrator to allow sole point of control

AT&T's new net management device will pave way for simplified voice and data net control.

By John Cox
Senior Editor

NEW YORK — AT&T is expected to announce here tomorrow a high-level network management product, called Integrator, that will let users control different voice and data nets from a single workstation.

The product, a combination of hardware and software, is likely to be seen as a test of AT&T's pledge to give end users products that tie together and simplify management of network offerings from AT&T and other vendors.

As the capstone of AT&T's Unified Network Management Architecture (UNMA), Integrator combines a minicomputer, workstation, application software and a relational data base, according to consultants who were briefed by AT&T.

This combination lets Integrator collect, process and act on data supplied by lower level network management systems. Those systems are designed to manage particular groups of network devices such as private branch exchanges, T-1 multiplexers and modems.

AT&T is also expected to announce with Cincom Systems, Inc. the first fruits of their joint development pact, announced last June, to bring Cincom's Net/Master network management software under the UNMA umbrella. The Cincom product is the leading commercial alternative to IBM's NetView product for managing Systems Network Architecture networks.

Analysts said they are uncertain whether AT&T will announce a complete peer interface to Net/Master or an intermediate

step. Such an interface would bring together for the first time integrated management of both physical and logical networks.

AT&T's Don Keller, division manager for network management systems, and Cincom's Walt Thomas, director of network management products, declined to confirm the announcement. Still unanswered is just how and when AT&T will be able to offer SNA net management with the Cincom Net/Master product.

Keller said the company officially regards IBM's NetView as just one more management system that Integrator can work with as a peer. He declined to elaborate.

A T&T insiders are calling the union the "NetView killer," one analyst said.

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rate. Unofficially, according to one analyst, AT&T insiders are calling the Integrator-Net/Master union the "NetView killer."

But users may not agree, said Joaquin Gonzalez, an analyst with Network Management Solutions, Inc. of Baltimore. AT&T will have a tough job convincing top MIS managers that its background in switched voice and transport management qualifies it as a contender in SNA environments, he predicted.

Integrator is expected to comprise an AT&T 3B minicomputer (continued on page 12)

Integrator to allow sole point of control

continued from page 11

running Unix, a Sun Microsystems, Inc. workstation as the network management console, application software and a relational data base, according to consultants. This combination will let a network operator collect, store and process alarm and status information as well as data for configuration and fault management.

As part of AT&T's push to translate UNMA's specifications — first announced in 1987 — into actual products, the company may also announce a new version of the existing Accumaster Consolidated Workstation. That product uses a windowing display to monitor six existing AT&T voice and data net management subsystems. The

workstation also supports IBM 3270 terminal emulation to access IBM's NetView SNA management software.

Top priorities

The new product may be a major step toward true integrated network management, according to James Herman, a principal with Northeast Consulting Resources, Inc., a Boston consultancy.

"The only thing now that links different management systems together in terms of action and reaction is the human operator," he said. "Integrator starts to give a single point of control for networks."

In this first Integrator release, that control is expected to be evident in two network functions that AT&T has publicly identified as the top priorities in the UNMA scheme: configuration management and

fault management.

Configuration management entails maintaining highly detailed information on every piece of equipment in the network, including name, location, connections, software release and revision level of the hardware components.

"Right now, you have to configure different network management systems independently," Herman said. "It's a lot of work. It's very time-consuming, and there's redundant data."

Herman anticipates Integrator will radically alter this state of affairs by providing a comprehensive configuration data base. This information can be downloaded to lower level net management systems. Conversely, changes at these lower levels will automatically update the main data base.

The second key network function Inte-

grator is expected to address is fault management, which monitors events across the network. To be effective, the AT&T product will have to consolidate alarm displays from different sources and sift through a flurry of different alarms to find the primary problem. In addition, Integrator will likely sport a capability to automate responses to a range of network events and conditions, Herman said.

As with other UNMA products, Integrator will support those parts of the Open Systems Interconnection Network Management Protocol (NMP) that have been defined so far. NMP compatibility is a key element in AT&T's integrated, multivendor net management strategy, analysts said.

OSI standards will let UNMA integrate control for customers' on-premises nets and equipment. They will also allow UNMA to reach out and probe net services provided by local phone companies and long-haul carriers, according to Atul Kapoor, vice-president of Kaptronix, Inc., a Haworth, N.J., consultancy.

"These other services are also getting sophisticated, and they're part of the customers' communications needs," he said. "Ultimately, they will all conform to OSI. And UNMA will be the consolidation point." □

Mux supports up to 24 voice channels

continued from page 11

Using Newbridge's proprietary voice-compression and data-switching techniques, the 3612 can support as many as 24 voice channels or 96 data channels over four 56K bit/sec lines, Michaels said.

"With the advent of very high-quality, low bit-rate voice," he said, "people can now reach areas where they simply could not justify a T-1 before."

In addition to the T-1 interface needed to support fractional T-1 circuits, the 3612 supports CCITT V.35, RS-449 and RS-232-C interfaces. It uses the same interface modules as the 3624 and 3630 MainStreet nodes.

"People can now reach areas they could not before."



The 3612 also supports Integrated Services Digital Network Basic Rate Interface circuits that distribute low- and high-speed data to Newbridge's 2600 MainStreet series of DTUs. The DTUs accept two 64K bit/sec channels for data and one 16K bit/sec channel for diagnostics, control and configuration. It can be programmed to handle data rates from 1,200 bit/sec to 128K bit/sec, Michaels said.

Besides feeding into a T-1 backbone, the 3612 can operate as a feeder multiplexer into public synchronous data networks such as AT&T's Dataphone Digital Service, he said.

The 3612 is scheduled to ship in the second quarter of this year. Prices range from \$3,000 to \$10,000, depending on configuration.

For more information, contact Newbridge at 13873 Park Center Road, Suite 160, Herndon, Va. 22071, or call (703) 834-3600. □

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Worth Noting

There are 38 million terminals, PCs and diskless workstations in the U.S. today. Only 16.5%, or six million of them, are connected on local-area networks. By 1998, 73%, or 78 million desktop devices, will be connected via local networks."

Tom Rush
Analyst
Business Communications
Co., Inc.
Norwalk, Conn.

etnotes

Microsoft Corp. said it will release this March a minor upgrade for its OS/2 LAN Manager that enables the communications software to support a virtually unlimited number of users and simultaneous applications.

The upgrade will be offered free of charge to LAN Manager users.

The technical feature increases the number of "file handles" on a LAN Manager network from 255 to 64,000. File handles are software components used by applications to access files. Each application uses a different number of file handles, depending upon the complexity of the program.

Certain types of application packages — such as sophisticated accounting systems — require 25 or more file handles per user, so the previous limit of 255 file handles presented a limitation to users and software developers.

By increasing file handle support, Microsoft will also make it possible for software developers to expand the number of users that can access a given application at one time. WordPerfect Corp.'s WordPerfect, for example, will now be able to support 240 concurrent users, instead of just 40. □

3Com expands functions of 3+ For Macintosh line

Support for Apple LocalTalk tops list of upgrades.

By Susan Breidenbach
West Coast Bureau Chief

SAN FRANCISCO — 3Com Corp. is upgrading its 3+ For Macintosh line of local network software by adding support for Apple Computer, Inc.'s LocalTalk as well as remote access features and enhanced electronic mail capabilities.

The LocalTalk upgrade provides users on a LocalTalk network with more server options. The new software, which was announced at MacWorld Expo here recently, will be available in April.

Currently, 3+ Open users that want to attach Macintosh units to their local networks must use a dual-server approach, connecting the Macintoshes to a 3+ server that in turn communicates with the 3+ Open server.

The new version of 3+ For Macintosh includes drivers for Apple's LocalTalk personal computer adapters.

Thus, any IBM-compatible server can support Macintoshes over LocalTalk. With the current version, only 3Com's dedicated 3S/200 and 3S/400 servers support both LocalTalk and Ethernet. When 3+ software runs on non-3Com servers, Macintoshes have to be attached via Ethernet adapters, not their built-in LocalTalk ports.

3Com also announced that Pacer Software, Inc. of La Jolla,

Calif., will help develop a version of 3+ Open LAN Manager that provides Macintosh users with file and print services.

The new remote-access feature will let users dial into a 3+ For Macintosh network via such third-party products as Solana Electronics' R-Server or Shiva Corp.'s NetModem.

3Com also announced that its EtherLink/SE adapter for the Macintosh SE is available for volume shipments. However, 3Com President and Chief Executive Officer William Krause said his company would not build an Ethernet adapter for the new SE/30 unless Apple agrees to sell it on an OEM basis.

It's in the mail

The new version of 3+ Mail For Macintosh lets users sort mail by sender, receiver, date or subject, so that it does not have to be viewed chronologically. Individual users can also have multiple mailboxes to keep different categories of mail separate.

Users of the new version will have point-and-click access to listings of all individuals and groups on the network so they will not have to know the exact spellings of user names or server addresses. The mail software also can be set up on the Macintosh operating system's multifinder to run as a continuous background task. □

LANMARKS
BY ROBERT CLARK

Terminology bogs down architecture debate

The topic of alternative local net architectures — centralized vs. distributed — has generated a lot of heat but not much light.

Each vendor claims its products are superior while lambasting the competition. Objective comparison is almost impossible since nobody seems to agree on common terminology. Not surprisingly, managers faced with the task of selecting a local net for their company or department can find it difficult to make an informed decision.

At a recent conference on client/server computing sponsored by Forrester Research, Inc., a Cambridge, Mass.-based market research firm, major local net vendors met to discuss the state of the industry and, if possible, to reach agreement on common terminology. They were unable to do so. Few vendors agree on any but the most basic definitions and will probably continue to describe their products and services according to their own interpretations of the terms now in use.

(continued on page 14)

Clark is director of marketing for TOPS, A Sun Microsystems Company.

Mac-to-VAX connections unveiled at Macworld Expo

Vendor	Product	Description	Availability	Price
Oracle Corp. Belmont, Calif.	Oracle For Macintosh	An SQL data base that may be used with DEC VMS and Ultrix versions of Oracle.	Now	\$199
Pacer Software, Inc. La Jolla, Calif.	PacerTOPS	Software that positions a DEC VAX as a file server in a TOPS local network.	Second quarter	Pricing has not yet been set.
White Pine Software, Inc. Amherst, N.H.	Mac241, Mac220	Software that emulates DEC VT-241 and VT-220 terminals.	Now	Mac241: \$299; Mac220: \$129

Users await results of Apple-DEC union

MacWorld Expo attendees go away with only third-party Mac-to-VAX connectivity offerings.

By Susan Breidenbach
West Coast Bureau Chief

SAN FRANCISCO — Users who made the trek to the recent MacWorld Expo here in search of Macintosh-to-VAX products from Apple Computer, Inc. and Digital Equipment Corp. left empty-handed, and they are not likely to fare much better at DEXPO East '89 in New York next week.

The year-old development alliance between the two companies has yet to bear any commercial fruit and is not likely to do so until much later in the year, according to Steve Wendler, a program director for Gartner Group, Inc., a market research firm in Stamford, Conn.

Apple officials at MacWorld Expo confirmed that product releases are near but declined to provide details. DEC had no representatives at the show.

Apple and DEC "are building some fairly complex things," Wendler said. An AppleTalk gateway to DECnet might be ready by the fall, but a planned Macintosh front end to DEC Windows will take much longer, he added.

At a developer's conference last August, Apple and DEC said they ultimately would offer connectivity services such as file access and terminal emulation, capabilities now available only from a handful of third parties such as White Pine Software, Inc., Alisa Systems, Inc. and Pacer Software, Inc.

Apple and DEC now, however, are developing tools that go beyond basic net services to foster third-party development of a higher level of integrated processes.

High-level integration

According to Peter Hirshberg, Apple's marketing manager of desktop communications, the two companies are working on data base integration tools for

creating distributed applications; interprocess communications mechanisms that will enable Macintosh and VAX applications to work together; and net management facilities that would let a DECnet administrator, for example, view attached Macintoshes as manageable DECnet nodes rather than as "black holes."

While Apple and DEC are taking a longer term view of the market for Macintosh-to-VAX products, third-party offerings continue to trickle into the market.

Two companies that provided users with some additional Mac-

The development alliance between the two companies has yet to bear commercial fruit.

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intosh-to-VAX connectivity at MacWorld Expo are White Pine Software, which is based in Amherst, N.H., and Belmont, Calif.-based Oracle Corp. (see chart, this page).

White Pine Software released two additional terminal emulation software packages for the DEC environment: Mac241, which lets a Macintosh emulate a DEC VT-241 color graphics terminal, and Mac220, which turns a Macintosh into a VT-220 terminal. Both terminal emulators can be adapted to local networks via specialized drivers. For example, Pasadena, Calif.-based Alisa Systems has software drivers that give users multiple concurrent sessions over both AppleTalk and DECnet networks.

Oracle brought some distrib-
(continued on page 14)

Users await results of Apple-DEC union

continued from page 13

uted data base capabilities and VAX connectivity to the Macintosh user with the MacWorld release of Oracle For Macintosh. The product is a full-featured SQL data base, but Macintosh users in a DECnet environment can turn it into a front end to the DEC VMS-based or Ultrix-based versions of Oracle.

Yet another third-party vendor, Pacer Software, briefed MacWorld attendees on its forthcoming PacerTOPS, which lets a VAX act as a file server to Sun Microsystems, Inc.'s TOPS network. The new product is an extension of PacerLink, which implements an AppleShare server on a VAX.

Mail call

Another joint goal of Apple and DEC is integrated electronic mail across a mixed DECnet and AppleTalk environment. Hirshberg called this the biggest hole in today's Macintosh-to-VAX solutions.

Alisa Systems is very close to bringing out an integrated mail system called AlisaShare. Don Cole, vice-president of marketing for the company, said it would be introduced soon, but he stopped short of promising it at DEXPO.

Alisa Systems currently has an interim E-mail solution on the market called TSSNet, which runs in background mode on the Macintosh and turns it into a device that can send and receive DECnet mail.

Although Apple's long-awaited token-ring adapter did not materialize, Gartner Group's Wendler said it is likely to debut this quarter. But looking at the broader connectivity picture, MacWorld did offer some non-VAX-related products of note.

There were quite a few prototype boards for the new Macintosh SE/30, which has yet another bus architecture, called the 030 Direct Slot.

Digital Communications Associates, Inc., based in Alpharetta, Ga., introduced an SE/30 version of its MacIrma 3270 terminal emulation board, and Avatar Corp. of Hopkinton, Mass., released a competing product called MacMainFrame SE/30.

Dove Computer Corp. of Wilmington, N.C., introduced an SE/30 interface for coaxial and thin coaxial Ethernet, and Kinetics, Inc. of Walnut Creek, Calif., unveiled an Etherport SE/30 Ethernet adapter that incorporates SynOptics Communications, Inc.'s LattisNet transceiver for unshielded twisted-pair cable. Farallon Computing, Inc. of Berkeley, Calif., said it will bring out an Ethernet extension to its PhoneNet product by the middle of the year. The new module will enable users to create hybrid networks containing both Ethernet-speed and LocalTalk-speed segments over standard telephone wire.

Salt Lake City-based Dayna Communications, Inc., which helped Novell, Inc. develop NetWare For Macintosh, introduced a network operating system for Macintosh local networks that runs on an IBM-standard server. Called DaynaNet, it is a customized, entry-level version of Novell's NetWare 2.15.

According to a Dayna Communications spokesman, DaynaNet has a slightly more Macintosh-friendly interface than NetWare 2.15 and has been tailored for Macintosh-specific cabling systems such as LocalTalk and PhoneNet. DaynaNet provides file and print services to as many as 100 users of DOS-based and Macintosh computers.

An interesting new product that many MacWorld attendees were confusing with a file server is Chorus, a "back-end processor" released by New York-based Human Devices, Inc. Chorus is a floor-standing unit that contains up to 16 floating-point processors operating in parallel, and it can be shared by Macintosh users across an AppleTalk or Ethernet network.

Computer-intensive applications such as engineering simulations and financial modeling can be sent from a local Macintosh to Chorus for processing. The applications do have to be adapted to the Chorus environment by developers, and Human Devices provides software extensions to the standard C, Pascal and Fortran development environments.

A unit with four processors is priced at \$25,000, and four-processor upgrades cost \$16,800 each. □

Terminology bogs down debate

continued from page 13

There was a consensus of opinion, however, that the label "server" — formerly restricted to describing a task-specific file server — can and should be used to describe any node on a network that provides a service. This includes (but is not limited to) electronic mail, gateway, data base and library services.

Furthermore, there was a general acceptance of the notion that local nets, as we now know them, exist in two variants of the client/server format. In the traditional centralized network, data and services reside on one or more servers; network users, or clients, can gain access to the data depending on their access privileges, which are defined by system administrators. Directly related to the terminal/host

more important. There's no doubt that, in certain circumstances, the centralized local net architecture is preferable. For example, when absolute security is paramount, the sophisticated security functions on many centralized local nets can help justify the expense of a system administrator. However, when members of a work group simply wish to share applications and peripherals on an ad hoc basis, it makes little sense to involve a third-party administrator.

Besides, most computer users can carry out their own system administration tasks, provided that the local net software is easy to install and use. If installation is simple, then it's reasonable to assume that users can determine which of their files and applications they want to provide to other users on the network.

Peaceful coexistence

Although the distributed network architecture eliminates the necessity of a system administrator, there are many situations in which the two systems can coexist. One example is a manufacturing company that is divided into departments based on job functions. All personnel using computerized systems for order entry, sales, shipping and accounting tasks are trained to use applications that access common customer and inventory data bases. If the company is large enough, there is an economic incentive to provide these workers with relatively dumb terminals linked to an expensive central file server.

Elsewhere in the same manufacturing firm, engineers and marketing personnel work in a much more autonomous fashion. The microcomputer users among them demand both power and data storage capability at the desktop and also wish to share data and peripherals. Such users, equipped with Intel Corp. 80386- or Motorola Corp. 68000-based machines and hard disks, are ideal candidates for a distributed network.

The distributed and centralized networks in our example manufacturing company are easily linked via bridges. Thus, authorized marketing personnel can extract monthly sales figures from the accounting data base, and financial management can broadcast memos to marketing and engineering personnel via the latter's E-mail system. System administration tasks are kept to a minimum since the needs of the centralized local net users are known and predictable, and the distributed client/server nodes can take care of their communications needs on an ad hoc basis.

Prospective network buyers should select the network architecture with the best fit for their company or department. If it is a firm whose employees need spontaneous, direct communications, the flexibility and immediacy offered by a distributed client/server network will be appropriate. If a company needs to connect more than 200 workers to highly secure data bases, the centralized client/server local net architecture offers economies of scale and centralized control.

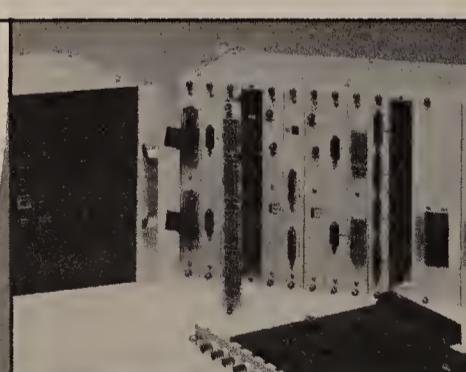
Whichever strategy is chosen, it's important to remember that nothing stays the same. The centralized local net is already integral to the operation of thousands of businesses. As those businesses mature and new customers enter the local net market, expectations of the services supplied by a network will change. To meet those expectations, we will see more and more hybrids — combinations of centralized and distributed nets. □

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MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USERS GROUPS AND ASSOCIATIONS

Worth Noting

Nearly 70% of corporate communications, including computer-to-computer data transmissions, phone conversations and meetings, involve purchase orders, according to a recent study of more than 100 firms in 28 industries by Bradley V. O'Brien Associates, a Villanova, Pa., research firm.

Dialogue

Do you agree with Bell operating company claims that regulation is hurting U.S. competitiveness in telecommunications markets abroad?

“The Bell operating companies are being held back, and that has some impact internationally. Overall, it's not a bad thing. [U.S. District Court] Judge Harold Greene has said he won't lessen that hold until the marketplace is equitable for all participants, and I don't see that happening.”

Dennis Finn

President
Wall Street
Telecommunications
Association
New York

“Regulation keeps phone companies from doing research and development that could produce manufacturing equipment and other services for export abroad. The U.S. is not gaining the experience in marketing new services and equipment that other countries are. There is a question, however, of whether the BOCs would be able to succeed in areas where companies like AT&T have not. Maybe they will, maybe they won't. The idea is that the more competitors in the marketplace, the greater the likelihood that one company will succeed.”

Stanford Levin
Professor of economics
Southern Illinois
University at
Edwardsville

Energy Telecommunications and Electrical Association Profile

■ Founded: 1928

■ Membership: 117 end-user companies from the oil, pipeline, gas, utility and energy industries. Member firms include: Boston Gas Co., British Petroleum Co. p.l.c., Chevron Corp., Dow Chemical Co., Exxon Corp., Houston Lighting & Power Co., Mobil Corp., Shell Oil Co., Texaco, Inc., Washington Gas Light Co. and Williams Pipe Line Co.

■ Purpose: Continuing education for energy telecommunications professionals.

■ Activities: Sponsors an annual conference and exposition in the spring and a technical seminar in the fall. Also publishes and distributes technical papers written by members and vendors.

SOURCE: ENERGY TELECOMMUNICATIONS AND ELECTRICAL ASSOCIATION, DALLAS

Users group helps energy firms get more from nets

ENTELEC offers forum to meet, discuss issues.

By Wayne Eckerson
Staff Writer

DALLAS — The decline in oil prices caused by the worldwide oil glut has bankrupted some U.S. energy companies and sent others scrambling to slash costs and improve operations.

Communications managers in oil, gas, pipeline and utility companies have responded to lean times by implementing new and enhanced communications systems designed to cut costs and give companies greater control over increasingly far-flung operations.

Forced to make tough strategy decisions and barraged by a perplexing array of communications equipment and vendors, managers have turned for assistance to a nonprofit organization called the Energy Telecommunications and Electrical Association (ENTELEC), based here.

ENTELEC's major activity is an annual spring exposition and conference.



Formed in 1928, ENTELEC is a users group that seeks to inform communications managers about new and emerging network technologies and to raise awareness about communications issues pertinent to the energy industry. ENTELEC's members represent 117 energy companies, including some of the world's largest corporations: Mobil Corp., Exxon Corp., Shell Oil Co. and Texaco, Inc.

Traditionally, ENTELEC has focused on supervisory control and data acquisition as well as two-way radio and microwave ap-

plications, according to David Hoxworth, ENTELEC's first vice-president and advanced senior telecommunications analyst at Marathon Oil Co. in Findlay, Ohio.

Supervisory control and data acquisition systems enable an operator sitting in a central location to monitor and control field operations at remote sites, such as a pipeline in Alaska.

The systems began to be used in the 1940s by pipeline companies that needed to control valves and pumps; monitor temperature, tank volumes and pressure; and retrieve meter readings on gas and oil pipelines that stretched for thousands of miles in uninhabited areas.

In recent years, supervisory control equipment has been enhanced to run remote ocean oil rigs and monitor the sale and loading of oil into tankers for shipment. The equipment enables companies to operate with fewer people and keep operational costs down.

Background

ENTELEC was formed by oil companies that wanted to share the use of lines on telephone poles running through oil fields in the Southwestern U.S.

Originally, the group was called the Petroleum Industry and Electrical Association. That name was changed to ENTELEC in 1978 to include all energy-related industries and to reflect the growing importance of telecommunications to energy operations.

ENTELEC's major activity is an annual spring exposition and conference that draws users and vendors for several days of workshops, presentations and exhibitions.

ENTELEC conferences, which usually attract more than 1,000 people, are intended to enable managers to exchange ideas

(continued on page 16)

Managers have little role in business TV

Television can be a strategic weapon, but net managers are seldom called on to implement it.

By Barton Crockett
Senior Editor

The only way most communications managers become involved with television is by turning on the TV after work.

Despite the fact that, by some estimates, 10% of Fortune 500 companies regularly broadcast internally produced television shows, few network managers are responsible for purchasing or maintaining the technology to support business television.

The reason? Very few users support business TV on the same network that carries other communications. Most companies maintain departments with expertise in video technology to run business TV projects, rather than require network departments to handle the technology.

“It's pretty rare for a networking or MIS department to be involved in business television,” said Russell Bittner, a New York account executive with Atlanta-

based VideoStar Connections, Inc., which sells business television systems. “Most of our sales go to managers of in-house studios.”

Why they use it

While most network managers are not involved with business television, users claim it is one of their most powerful communications tools.

Business television shows can be impressive, featuring such formats as live call-in talk shows and presentations from top corporate officers.

Companies that use business television say it can increase the visibility of key players in the corporation who otherwise might not be seen by most employees.

Some firms even use business TV to perk up sales. Dallas-based Texas Instruments, Inc., for instance, operates a business television network that it has used to

(continued on page 16)

INDUSTRY BRIEFS

BY BARTON CROCKETT

How do you communicate? If you're like most businesspeople, probably through lots of paper.

A recent Bradley V. O'Brien Associates study of more than 100 firms in 28 industries found that 40% of all business communication involves exchanging invoices, purchase orders, memos and other paperwork. Of the remainder, about one-quarter involves face-to-face meetings, 20% occurs on the phone and 15% is computer-to-computer data transmission.

The Villanova, Pa.-based market research firm defines business communication as any transfer of information from customer to vendor, vendor to vendor or vendor to customer.

The researchers found that most industries have a basic information flow pattern. This pattern changes very little over time, although the means of moving data may change. For instance, sales departments typically receive and process customer purchase orders, even after an extensive electronic data interchange network is cut over.

Nearly every industry has a strategic communication system without which business could come to a halt. Industries were divided into three types based on the most important transaction. Some industries are order-driven. If customer orders are not received, essentially nothing is done. Included in this category are hospitals, banks and securities companies.

Other industries are schedule-driven. These firms succeed by forming schedules for delivering the products that are most attractive to customers. These include airlines and manufacturers. The third type are inventory-driven. These firms build products or sell services to meet an expected demand. To the extent that these firms misjudge demand and their inventories become too big or too small, they are unsuccessful. Retailers, insurance companies and car rental agencies are in this group.

The report is titled “Telecommunications Applications: A Basic Market Research Study.”

Managers have little role in business TV

continued from page 15

conduct four technical seminars on artificial intelligence. One broadcast was viewed by 65,000 potential customers in 16 countries.

"You tell me any other way we can contact 65,000 prospects at one time," said Al Bond, TI's manager of business television. "This series has helped make the terms 'TI' and 'AI' synonymous in this industry, which is an important subliminal message for us."

Cost issue

Users of business television get these advantages at a premium because the technology is expensive. According to Bittner,

receive-only satellite dishes for broadcasts cost, on average, \$10,000 each, and they must be installed at each reception site. Transmission and production costs for an average show run between \$30,000 and \$40,000, he said.

Given these costs, it seems logical for users to try to use existing satellite networks for business television. But, for a number of reasons, this is seldom done.

Most companies do not want to interrupt the flow of data communications over a satellite link, for example, for video broadcasts.

In addition, television transmissions have different satellite transponder requirements than data networks, meaning companies often must use separate uplink facilities for television and data transmissions. That can be expensive.

Tuning television networks to handle data traffic is also a difficult and expensive technical chore.

Data communications satellite dishes must be able to send and receive information. Rigging television receive-only satellite dishes to do this can almost double the cost of the dishes.

Businesses also must often add regional hubbing stations for data networks that simply are not needed in television nets.

Some users involved

With little need to mix business TV with other communications, most companies leave responsibility for managing television networks with professionals who are familiar with video technology.

But some network managers, committed to improving communications in their

firm, have taken it upon themselves to champion the use of video technology.

One such manager is Jim Ellis, vice-president of telecommunications at New York Life Insurance Co. Last summer, Ellis teamed up with the insurance firm's vice-president for public relations to successfully pitch a business television pilot program to the company's executive management committee, which includes New York Life's chairman.

The four shows that have aired so far have carried live question-and-answer training sessions for insurance agents and seminars explaining New York Life Insurance products to potential customers.

When Ellis lobbied for the series, he had been at the insurance company only seven months.

"I felt that the business TV system needed someone in the technology department to support it," he said. "I was nervous about selling this thing to the board. But in the end, I think it really might benefit our company."

Group helps firms get more from nets

continued from page 15

about improving and expanding communications services. This year's conference will be held March 19 to 22 at the Superdome in New Orleans.

An important part of ENTELEC conferences is the technical program, in which members and outside vendors are invited to present technical papers in four major categories: supervisory control and data acquisition equipment; data and voice communications technology; radio frequency transmission equipment; and microwave applications.

Broadened scope

Lately, ENTELEC has been trying to broaden its scope by focusing more on conventional networking technologies, such as T-1, local networks, satellite communications and Integrated Services Digital Network.

For the past two years, ENTELEC has offered a fall seminar to address specific topics in data and voice communications. This year, ENTELEC's seminar will focus on T-1 carrier systems and networking. Previous seminars have addressed very small aperture terminal satellite systems and ISDN applications.

According to Hoxworth, ENTELEC members are becoming interested in using T-1 networks as a way to pare communications costs. T-1 facilities have recently dropped in price and become more economical for midsize users, he said.

In addition, as oil drilling operations stray farther into remote sites, communications managers have shown great interest in satellite technology such as VSATs.

VSAT dishes provide energy companies with a lightweight, mobile communications unit that can be set up in remote oil drilling locations with little difficulty or delay. VSATs may replace microwave and two-way radio as a means of transmitting supervisory control data from remote operations to central offices.

ISDN holds the promise of providing high-quality voice and data communications in remote locations where companies cannot justify the expense of building a private network.

For more information about ENTELEC, write to the organization at P.O. Box 795038, Dallas, Texas 75379, or call (214) 578-1900.

On the surface, all earth stations are not alike.

Some companies would like you to believe there's really no difference between one earth station and another.

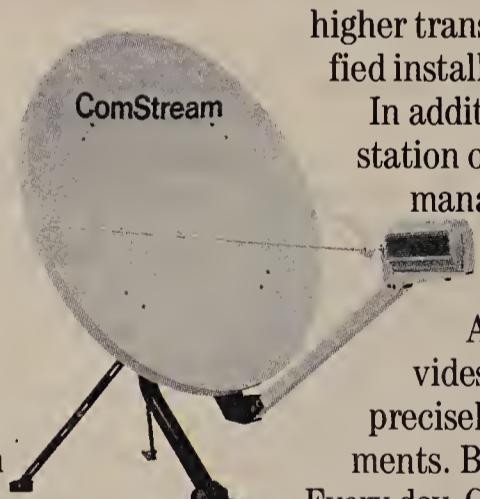
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PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

Worth Noting

Next week: A Telecom Buyer's Guide looks at T-1 and T-3 multiplexers and highlights important differences in features and functions.

First Look

Coastcom introduces single-link T-1 mux

Coastcom recently introduced a low-end T-1 multiplexer that supports a single T-1 link and an integral data service unit.

Tim III connects as many as eight asynchronous or synchronous data channels operating at speeds ranging from 2,400 bit/sec to 1.54M bit/sec to a single T-1 line.

The multiplexer also supports adaptive differential pulse code modulation boards, which digitize voice at 32K bit/sec and enable users to squeeze two voice channels onto a single 64K bit/sec DS0.

Tim III can be programmed to support a number of different configurations automatically at different times of the day. The multiplexer supports both Alternate Mark Inversion and bipolar eight zero code substitution line-encoding techniques. It also supports V.35, RS-449 and RS-232 interfaces.

Tim III can be configured to support D4 or extended super-frame (ESF) framing techniques. ESF provides diagnostic information not available with D4. An optional channel service unit (CSU) supports remote diagnostics.

Tim III is configured from an attached terminal using menu-driven software. The multiplexer can also be controlled via local or remote IBM Personal Computers running Coastcom's NCC II or NCC III network management system software. Tim III can reside in 19- or 23-in. racks and will be available in February for \$3,900. That price includes a CSU.

Coastcom, 2312 Stanwell Drive, P.O. Box 27068, Concord, Calif. 94527, or call (415) 825-7500. □

Bridge links AppleTalks, IBM PCs

By Jim Brown
New Products Editor

SAN FRANCISCO — Shiva Corp. used the recent MacWorld Expo here to announce a bridge that links Apple Computer, Inc. AppleTalk local networks and software that enables IBM Personal Computer users to dial into AppleTalk nets.

Shiva's stand-alone TeleBridge attaches to an AppleTalk network and supports an external modem. The product works with dial-up or leased lines and supports an asynchronous data throughput rate of between 1,200 and 57.6K bit/sec.

TeleBridge runs Shiva's Dial-In Network Access software to establish connections between TeleBridges. The bridge maintains a directory of remote AppleTalk devices.

To use the product, local Macintosh users select the device they want to access and the TeleBridge dials the remote Apple-

Talk network. Once connected, the local Macintosh acts as if it were attached to the remote network.

TeleBridge supports only one AppleTalk link at a time, but multiple TeleBridges can be attached to the same AppleTalk network.

TeleBridge also runs Shiva's Internet Manager software. The program displays the location and status of every remote AppleTalk device that is accessible via TeleBridge. Network administrators can use the program to establish passwords that users would need to access remote AppleTalk networks.

Shiva's DOS Dial-In software runs on DOS-based IBM Personal Computers equipped with a dial-up or leased-line asynchronous modem operating at up to 19.2K bit/sec. It enables Personal Computer users to dial into a Shiva NetModem, NetSerial or TeleBridge — which act as gateways — on AppleTalk networks.

Available now, TeleBridge sells for \$499. Single-user versions of DOS Dial-In sell for \$99 each and are expected to ship later this quarter.

Shiva can be reached by writing to 155 Second St., Cambridge, Mass. 02141, or by calling (617) 864-8500. □

Timeplex boards upgrade Link T-1 multiplexer line

By Jim Brown
New Products Editor

WOODCLIFF LAKE, N.J. — Timeplex, Inc. recently introduced two boards that enable its Link family of T-1 multiplexers to support several new features, including substrate data multiplexing and switched 56K bit/sec data services.

The boards were announced in conjunction with Timeplex's introduction of fractional T-1 support ("Timeplex to support new T-1 service," NW, Jan. 16, and "Fractional T-1 high on many users' lists," NW, Jan. 23). Timeplex also announced it has increased the number of nodes a single Link-based network can support, from 160 to 252.

The new Substrate Channel Processor board enables a Link multiplexer to support digital data service links composed of several lower speed circuits.

The Substrate Channel Processor board demultiplexes the digital data service circuit into five channels. It also supports a secondary channel capability that enables a digital data service circuit to support diagnostics.

Timeplex's other new board, the Quad Synchronous Processor (QSP), has four ports and can be configured to support any of four

new features. The board supports RS-232-C, V.35 and RS-422 interfaces.

The QSP board enables a Link node to access central office-based switched 56K bit/sec data services. The board uses 64K bit/sec DS0 channels to transmit 56K bit/sec data channels to a central office via T-1 lines. The central office strips the DS0 channels supporting 56K bit/sec data and completes the call via the switched network.

The switched 56K bit/sec data service access feature lets users establish dial-up 56K bit/sec digital links with remote locations at a lower price than dedicated 56K bit/sec lines. The feature can also be used to back up microwave circuits.

In addition, the QSP can be configured to support a broadcast/polling feature that enables a Link node to simulate a multi-drop line. For example, a front-end processor attached to one port of a central-site Link node can poll devices attached to several different ports on a remote Link node. Previously, those remote devices had to be connected to a single Link node port via a port-sharing unit.

With a QSP, a Link node (continued on page 35)

Netronix introduces plastic fiber LAN

Interface boards, net hubs support fiber spans up to 500-ft. long, speeds up to 2M bit/sec.

By Wayne Eckerson
Staff Writer

PETALUMA, Calif. — Netronix recently introduced one of the industry's first plastic fiber-optic local networks.

Called FiberStar PC, the star-configured network consists of personal computer interface boards and net hubs that support plastic fiber spans up to 500-ft. long. FiberStar PC also supports glass fiber when segments longer than 500 feet are needed.

The Ethernet-like network supports as many as 240 IBM-compatible personal computers at speeds up to 2M bit/sec. The network runs Novell, Inc.'s NetWare, IBM's Network Basic I/O System and the Transmission Control Protocol/Internet Protocol. No formal standards have been developed for plastic fiber local networks, although some analysts said standards will be forthcoming sometime in the next several years.

Until now, plastic fiber could not support links more than 50-ft. long. But by shooting more light through the fiber and improving the design of amplifiers, detectors and connectors, Netronix increased that distance by 10 times.

Plastic fiber offers local network users several advantages, according to the company. It provides better protection against eavesdropping and electromagnetic interference than twisted-pair wire or coaxial cable, and it is more pliable and easier to install than glass fiber.

"FiberStar PC was designed so that a user could set up the network and install the plastic fiber segments without hiring specialized installers," said Netronix President Arthur Jopling. Jopling said a user could install or repair a plastic segment in a matter of minutes.

"Plastic fiber will be an attractive option for small work groups located on a single floor or where fiber is a network requirement because of data security needs," said Richard Villars, an analyst with International Data Corp., a market research firm in Framingham, Mass.

Villars said he thinks plastic fiber is much easier to tap than glass and should eventually become the low-cost alternative to glass in local net environments.

In two years, Jopling said, plastic fiber will be able to support throughput speeds of 10M

bit/sec at distances greater than 500 feet. He also said that speeds of 50M bit/sec are a distinct possibility in the foreseeable future.

Network configuration

In the FiberStar PC's topology, fiber-optic hubs are used to support clusters of personal computers. Each hub serves as the network controller and transceiver for as many as 16 personal computers or other fiber hubs. The hubs regenerate optical signals, thereby increasing the distances the network can span.

Netronix PC Optical Fiber LAN adapter boards, which are insert-

Jopling said a user could install or repair a plastic segment in a matter of minutes.

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ed into each computer on the network, transform electrical signals from the computer into light pulses and back again.

A central fiber hub usually located in a wiring closet supports fiber links to as many as 15 network hubs. All data traffic is routed from network hubs to the central hub and back out to individual nodes on the network. The central hub also supports a dedicated link to a network management system.

FiberStar PC can be connected to Ethernet, AT&T's Starlan and broadband local networks using media-independent bridges supplied by Netronix.

Initial demand for FiberStar PC will come from government agencies that require a high level of data security such as the Central Intelligence Agency and the Department of Defense, Jopling said.

He also expects to sell to manufacturing plants, electrical power plants and hospitals that are unable to run twisted-pair or coaxial networks because of electromagnetic interference caused by operating machinery, he said.

Adapter boards for the FiberStar PC network are priced between \$595 and \$895, and the 16-port fiber-optic hubs cost \$2,195. All products are available now. □

OPINIONS

NETWORK MAINTENANCE

BY JEFFREY KAPLAN

Self-reliance implies user dissatisfaction

A recent *Network World* article discussed the growing reluctance of communications managers to discuss their network budgets and internal operations with outsiders ("Communications budgets gain trade-secret status," *NW*, Dec. 19). The article suggested that the reason for managers' reticence was the growing recognition that their communications facilities are important competitive assets that they can no longer take for granted or proudly display for all to see.

An important by-product of this trend is the decision by many users to take greater responsibility for managing and maintaining their own networks. A 1988 survey by The Ledgeway Group, Inc. of more than 600 communications

managers from Fortune 1,000 companies revealed that many of those companies have opted to maintain their own networks. Communications managers still rely on vendors for traditional remedial maintenance and equipment repair. However, the managers surveyed indicated that they expect to increase the portion of their network budgets dedicated to in-house staff salaries during

the next two years while decreasing expenditures for outside network support services.

A basic reason for this shift is that users are frustrated with the service and support that vendors provide. Many vendors do not have well-managed service programs that respond quickly when a user's network is in trouble. Even more vendors lack sufficient field service personnel to staff their customer support operations. As a result, users cannot rely on vendors.

The high turnover rate among field service personnel creates another problem. Each time a new field service agent is assigned to an account, the user must familiarize the technician with the specific aspects of the company's network facilities. Often, just as the service agent becomes familiar with the user's operations, he will move on to a different vendor for a sizable salary increase. And the user must train another agent.

In addition, managers are often dissatisfied with the level of training that field technicians receive in business applications and multivendor integration. Generally, service agents are trained to fix boxes, not to solve users' networking problems.

Because of this environment, users are taking the bull by the horns and investing in their own technical support staffs. This trend could have serious consequences for vendors, for whom the service business has been a major source of revenue. Many vendors are already feeling the effects of the 'Maytag repairman syndrome' that exists in the industry today. And now users are threatening to take more business away from their vendors. Customer self-service currently represents nearly 30% of all network support services provided today. And this figure could increase if current conditions continue.

What can vendors do to prevent this? Invest in service organizations. Pay competitive salaries and provide comprehensive training that focuses on business applications and multivendor integration issues. Treat the user as a full partner rather than as a captive hostage.

Vendors must realize that users are becoming more sophisticated and have greater resources at their disposal. Unless vendors work to regain users' confidence, they are going to lose more of their service business to the users themselves. □

Kaplan is director of networks and professional services for The Ledgeway Group, Inc., a consulting firm in Lexington, Mass.

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EDITORIAL

AT&T manipulates the system to its advantage

Forced to contend with continued regulation in an increasingly competitive market, AT&T is pushing the tariff process beyond the limits of reason in an effort to gain greater market freedom. Although it is technically playing by the rules, AT&T is, in effect, taking the law into its own hands.

The carrier's arsenal of strategic tariffs — Tariff 12, Tariff 15 and now Tariff 16 — give AT&T the freedom to decide when it can go off the rate card in competitive situations. This is the antithesis of conventional regulation.

Whether you agree with AT&T's tactics or not, it's hard to fault the carrier's efforts because it has the tacit approval of the Federal Communications Commission: The FCC hasn't ruled on the legality of any of the strategic tariffs, even though Tariffs 12 and 15 have been in limbo for months.

Until the FCC tells it otherwise, AT&T is free to propose these tariffs to users. In fact, Joseph Nacchio, vice-president of AT&T's Business Markets Group, said at a recent briefing that the company may file up to 200 Tariff 12s this year.

Nacchio pledged that AT&T will use the tariff process to compete aggressively until the yoke of regulation is lifted. The carrier argues that the long-distance market is now competitive; therefore, AT&T should no longer be considered dominant.

As evidence of the competitive environment, AT&T lost

some \$100 million in corporate accounts last year, Nacchio said. Just recently, AT&T was replaced as the primary carrier for Zenith Electronics Corp., which represented roughly \$1 million a year in business.

Competitors argue that the company is still growing. "AT&T still has 70% of the inter-LATA market, and the number of minutes it carries continues to increase," claims Leon Kesten-

Given AT&T's promise to use the tariff process to achieve its goals, what can we expect? A Tariff 17? A Tariff 18, 19 and 20? Tariff 18, 19 and 20?

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baum, a lawyer for US Sprint Communications Co. "The decrease in market share AT&T has experienced is a natural consequence of opening the market to competition."

Perspective is everything. From AT&T's vantage point, it is discriminatory to manage the game using two rule books. What distinguishes a competitive market from one dominated by a single player?

Although resolving that question would not lead to harmony, it would help settle the industry

by establishing a reference point that regulators could use to evaluate carrier attempts to manipulate the system to their advantage.

Given AT&T's promise to use the tariff process to achieve its goals, what can we expect? A Tariff 17? A Tariff 18, 19 and 20? The recent filing of Tariff 16, which would allow AT&T to provide special rates to certain government users, showed that the company is wary of putting all its eggs in one basket.

Although each passing day makes it less likely that the FCC will reject the controversial tariffs, it is still too risky for AT&T to funnel too many major accounts into them. Besides providing redundancy of sorts, multiple tariffs further AT&T's aim of keeping competitors on the defensive.

While AT&T has had some luck using the tariff process to gain a degree of freedom, its efforts fall far short of the freedom it would gain if the regulations were lifted altogether. The tariff process, after all, is still slow and ponderous. The company lost \$7.5 million in business last year when a customer jumped ship because of delays regarding Tariff 15. Other customers could follow suit.

But the FCC is awaiting its marching orders from the Bush administration and is unlikely to reject the tariffs. Unless a more decisive commission is put in place, expect to see AT&T trot out lots of Tariff 12 and Tariff 15 deals this year. □

OPINIONS

THE PRACTICE OF ENGINEERING

BY DANIEL MCDEVITT

Ignorance and incompetence plague users and vendors

The editorial "Ignorance is no excuse for incompetent sales support" (NW, May 9, 1988) and Jim Innes' rebuttal, "Ignorance is no excuse for vendor abuse" (NW, Aug. 15, 1988) both missed an important point. Both communications users and vendors can be guilty of incompetence — and its traveling companion, ignorance — when it comes to fulfilling users' operating needs and applying communications, computer and control technology.

Too many vendor representatives don't know their own equipment specifications, much less the complexities of network interaction. Few users know a key set from a modem. When incompetent and ignorant users and vendors meet, problems are bound to result.

Why is there so much incompetence regarding communications, computer and control system applications — especially in networking? It seems that although hundreds of thousands of people are working in communications and computer sales and operations, few have actually applied the technology.

One source of the problem is that very few vendors and users have engineered the systems they sell or use. Systems engineering specialists from AT&T Bell Laboratories and IBM — probably less than 1,000 people at peak periods — performed all the application engineering for their sales staffs and users.

But now, most of these competent application designers have retired and are in consulting engineering, or they are employed by the few big users that can afford them.

Another problem is that sales, by their very nature, are adversarial transactions. The vendor is trying to sell whatever it can at the highest price it can to make the highest profit. The best way to keep competition out is to do as Ma Bell did in the old monopoly days: Do the application engineering yourself.

Another, easier way for vendors to lock out the competition is to latch onto an ignorant user. The unwitting user goes like a lamb to slaughter, following the

McDevitt is president of Progress Engineering, a communications, computer and control application engineering company in Tulsa, Okla.

vendor the way a teenager might follow a used car salesman.

The user, on the other hand, wants to purchase a suitable application at the lowest cost possible. Because of this, users often set themselves up as victims of predatory sales pitches. They are after so-called "free" application engineering, for which they expect to spend nothing more than a few hours of their time.

Add up the incompetence and ignorance on both sides of this transaction, plus the fact that few vendors can supply the total system package and so must

When incompetent and ignorant users and vendors meet, problems are bound to result.

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specify someone else's equipment or service, and then add in the pressure on both sides. It's a wonder the courts aren't even more jammed with complaints.

As Innes pointed out, constant education of both users and vendors is the remedy for incompetence and ignorance. But the education necessary to resolve this situation is three-fold:

- Users, realize there ain't no such thing as a free lunch. Caveat Emptor!
- Vendors, when you offer to — or actually do — survey, investigate, analyze, consult, evaluate, design or plan any user's communications, computer or control application, realize that you are offering to practice — or are practicing — engineering. And practicing engineering without a license is illegal in every state and the District of Columbia.
- Users and vendors, realize that if you refuse to educate yourselves, you deserve exactly what you get from these transactions. In most cases, the user gets an overpriced, less-than-adequate system and, in some cases, a totally inoperable mess.

The recent fiasco in which the U.S. House of Representatives invested \$20 million in a phone network that initially was inoperable comes readily to mind.

And in the long run, the vendor fails to get enough of the super-profitable sales to pay for the wasted "free" engineering, and it opens itself up to all kinds of legal actions for fraud and contract noncompliance.

Were the vendors' supposedly "professional engineering" staffs cited in Innes' examples of a chemical firm and regional utility company licensed? Probably not. Were the vendors licensed to practice engineering? Probably not. Were the laws on the practice of engineering broken? Probably.

Is it realistic to expect users to keep on top of technology despite rapid change and burgeoning complexity and to know their business and how their network relates to it thoroughly? Definitely not.

How can anyone possibly expect a user to retain a competent application system design engineer for the occasional network implementation, addition or change? Even if a user could afford such an application engineer, how could that engineer hope to stay abreast of technology without constantly performing application engineering on a multiplicity of systems with varied purposes? What application engineer worth his salt would stay with a company under such restrictive conditions?

Until incompetent, ignorant and greedy users and vendors understand that there are competent application engineers who provide users with technical expertise, are regulated by state and federal agencies, and work for a multitude of clients with different applications, the current proliferation of low productivity, wasted time and money, inoperable systems, damaged careers, lost customers and bankruptcies will persist.

Please, users and vendors alike: Don't heed this advice! The fees are much bigger on application repair and rescue engineering than they are when we engineers are called in at the beginning. And the fees are even larger when we serve as expert witnesses in damage suits.

We make a very good living as system application engineers, repairing the damage done in organization after organization by the incompetent and ignorant do-it-yourself user and the equally inept, and often unscrupulous, vendor. □

TELETOONS

BY FRANK AND TROISE



Well, why not? It's the Information Age, isn't it?

LETTERS

E-mail offering clarified

We read with interest the article regarding electronic mail offerings in your Dec. 5 issue ("E-mail systems feature gateways, fax capability").

The article provided a comprehensive, fair overview of the E-mail market, and it was surely helpful to prospective and present users of this technology.

It did, however, mention that McDonnell Douglas' E-mail product, OnTyme, had a minimum monthly charge of \$300 per user.

This is misleading, since the actual charge is \$300 per account. With many OnTyme accounts numbering in the thousands of users, the point

is not insignificant.

We appreciate the opportunity to clear up this matter and hope that you continue your excellent coverage of this blossoming industry.

Steven Eng
OnTyme product manager
McDonnell Douglas
Applied Communications
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San Jose, Calif.

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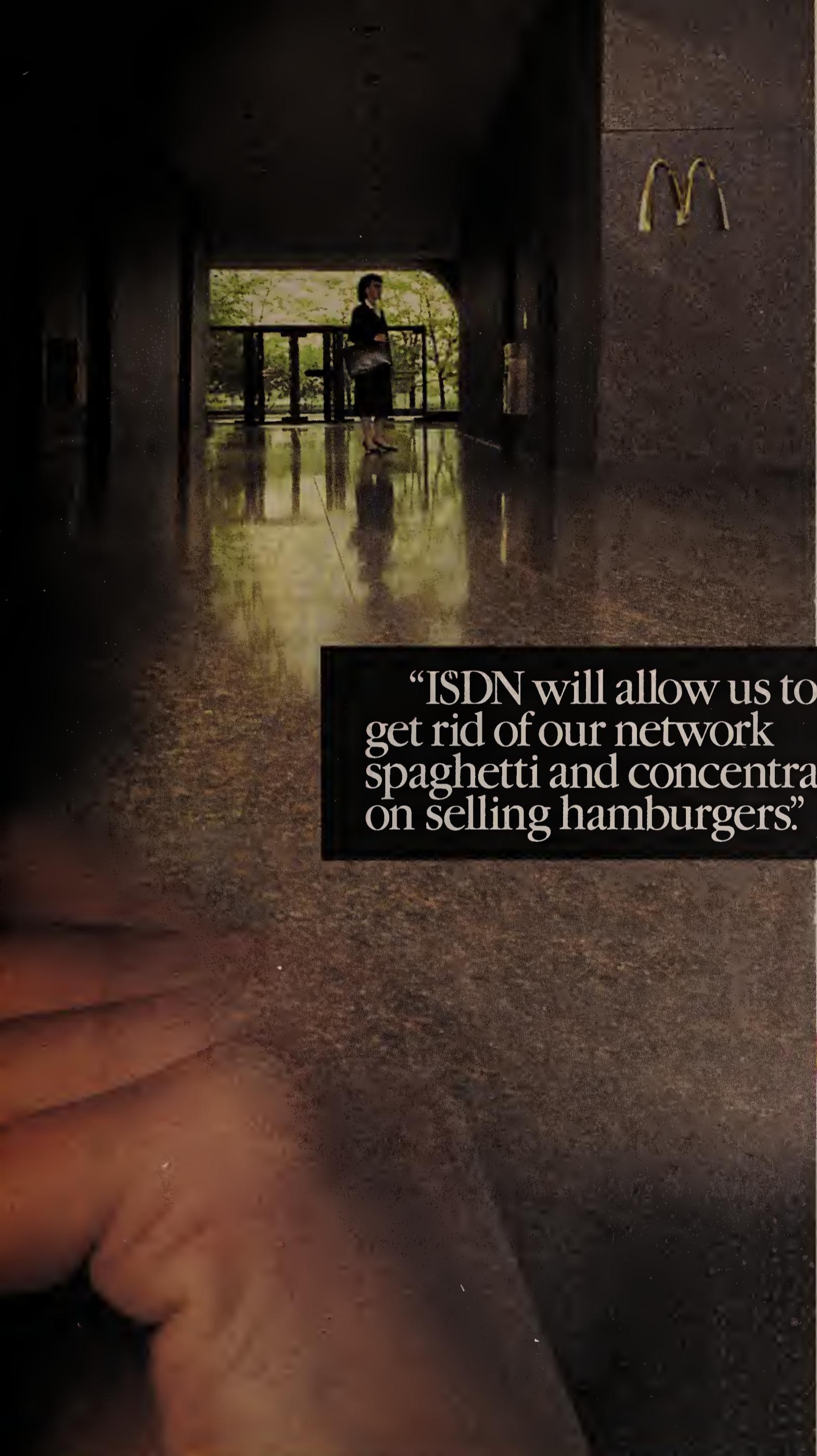
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If you'd like to write a column, contact Steve Moore, features editor, *Network World*, Box 9171, Framingham, Mass. 01701, or call (508) 820-2543, ext. 732.





McDonald's faced a challenge. They were spending too much time and resources maintaining 21 different communications networks, rather than on what they do best: selling hamburgers.

And McDonald's is growing at the rate of one new restaurant every 17 hours.

As Bonnie Kos, McDonald's V.P. for facilities and systems, put it, "We had to adapt a single approach to all our communications that not only got rid of all our network spaghetti, but allowed us easy connectivity and communications between computers that use different protocols."

The approach they chose was ISDN.

Ameritech's Illinois Bell, in conjunction with AT&T Network Systems, and using a 5ESS® switch, used ISDN to allow McDonald's to migrate to a single, integrated, all-digital network.

So now, McDonald's sends integrated voice and data over an ordinary telephone line. Turning every work station into an information center, while minimizing costs and gaining greater network control.

But, the advantages of ISDN go beyond simplifying and connecting McDonald's communications network.

ISDN will soon allow the company to access more current market data, quickly track product promotions, streamline inventory control and reduce administration workloads. All this means more time to spend one-on-one with the most important part of McDonald's business—the customer.

Even now, McDonald's is using such advanced ISDN features as calling number identification, electronic directory, and high-speed, high-quality facsimile transmission without dedicated lines.

As Bonnie Kos summed it up, "ISDN is letting us do a lot more with a lot less."



The Future's on the Line.

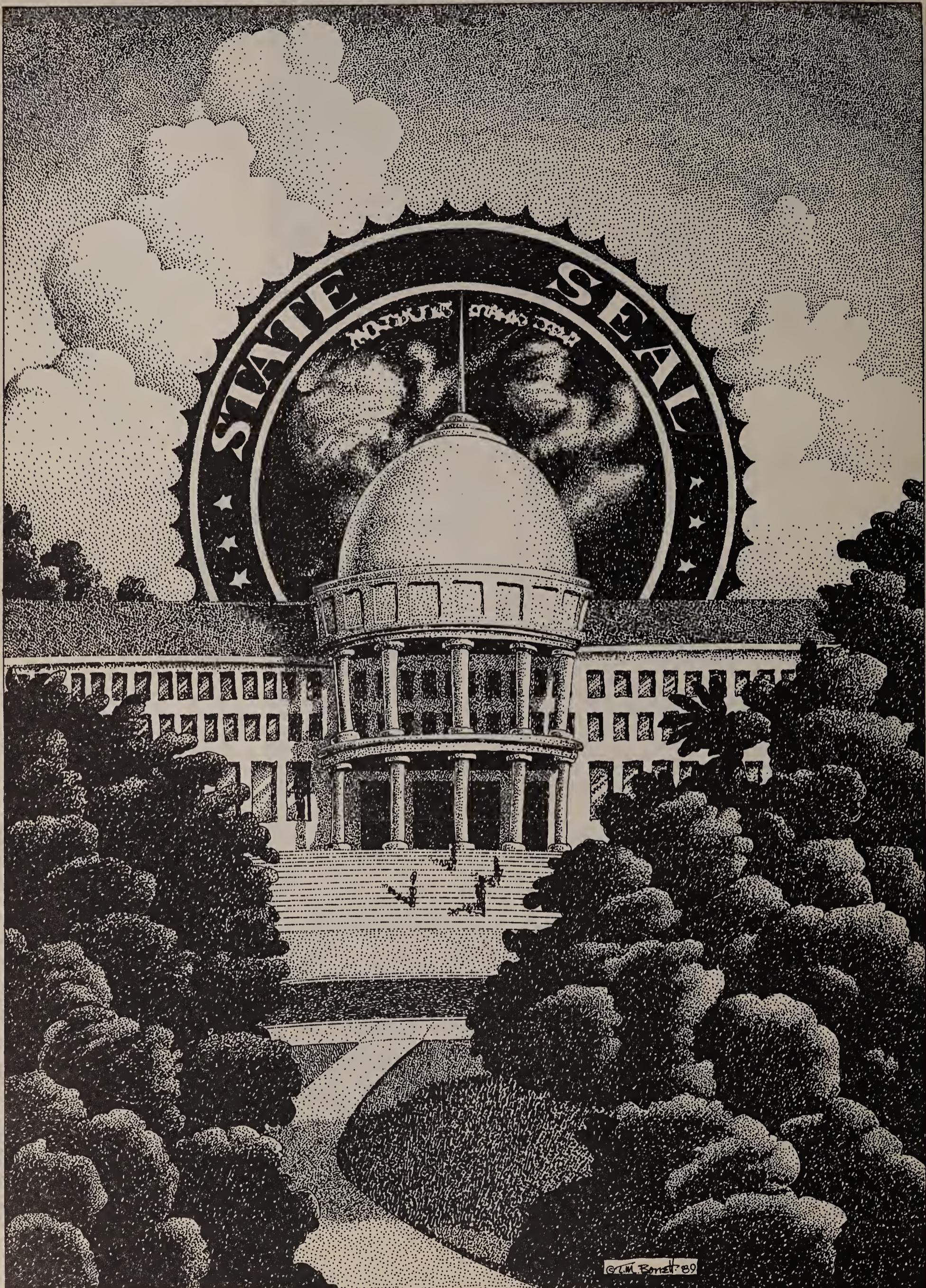
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Doing more with less

CONTINUED FROM PAGE 1
ment vendors. In many states, the government is the largest telecommunications user.

Many state governments, however, do not have a cohesive approach to managing their telecommunications systems. But recent events have forced them to reexamine their situations.

State telecommunications managers are now faced with the following challenges:

■ **Cost reductions.** Most state governments are looking for reductions in funding for noncritical functions. They are slashing travel budgets, and one New England state recently stopped printing maps and telephone directories as a cost-cutting measure.

■ **Freeze in capital expenditures.** The mood of most state legislatures is to avoid any new capital expenditures and to minimize capital outlays for anything as esoteric as networking.

■ **Personnel reductions.** Many states are reducing their work forces, slowing promotions and limiting overall cost-of-living

Marsan is a senior consultant and Held is a principal with Network Strategies, Ernst and Whinney's telecommunications consulting practice located in Fairfax, Va.



raises in an effort to keep costs down. This tends to make it even more difficult for states to retain critical telecommunications professionals.

■ **Legal and liability issues.** The failure of a state government telecommunications system can

lead to legal action against the state itself. The failure of a law enforcement network, for example, can endanger officers or cause slow response to emergencies, and the state could be held liable for any resulting injuries.

The net result of these trends is that state telecommunications managers are being asked to do more with less — to provide better service to more locations while spending less money and using smaller staffs. In most cases, the only way to achieve these rather contradictory goals is to implement improved network technology.

Current uses

State governments currently use networking to provide many services effectively to residents.

One instance in which most residents encounter state government networks is when they get their vehicle titles or driver's license. The Department of Motor Vehicles in each state must maintain huge data bases of motor vehicle license holders, restrictions and renewal dates, and must be able to retrieve this information in real time.

Slow responses to data base inquiries (which, unfortunately, are the norm) often make trips to the Department of Motor Vehicles

(continued on page 24)

Deficits and budget cuts are forcing states to find creative uses for telecommunications.

(continued from page 23)

time-consuming and unpleasant. But by implementing more reliable, high-speed digital networks, some departments have made a serious effort to shorten the chronically long lines.

Law enforcement agencies also rely heavily on telecommunications networks to provide immediate information on emergencies and criminal activity. Since the difference between life and death is often a matter of seconds, it is crucial for police departments to have fast, reliable communications.

Often, state police departments serve as central clearinghouses of crime information and act as gatekeepers for access to federal systems such as the National Crime Information Center operated by the Federal Bureau of Investigation.

In addition, law enforcement agencies are major users of mobile radio equipment, which enables their officers to respond quickly to emergency situations.

The Pennsylvania State Police, for instance, uses nearly 3,000 mobile and portable radio units, supported by a microwave network with nearly 100 links. A high-speed statewide digital backbone is essential to guarantee that critical police voice and data traffic will be rerouted to its destination in the event of a network failure. Data encryption schemes are sometimes used to ensure that the confidentiality of police files is not compromised.

State welfare agencies use networks to distribute welfare checks and food stamps. As with law enforcement agencies, short response times and reliable service are critical to providing these services on a

timely basis. Every state administration wants to avoid the political embarrassment of failing to provide welfare checks on time to its most needy citizens.

In most states, the welfare system is one of the largest users of computer and network applications, and it is growing at a fast pace. It is not unusual for a welfare network to have 5,000 or more terminals.

In education, state universities are taking advantage of statewide networks to connect campus branches. Such connections enable students and faculty to use computers, peripherals and gateways at remote campuses.

The Indiana Higher Education Telecommunications System is using Intelenet, a statewide fiber-optic network, to broadcast classes from one campus to other educational institutions in 17 major cities

throughout the state. This network is an attempt to produce a more educated work force. Intelenet provides T-1 and 56K bit/sec service to locations in Indiana that otherwise would not have seen high-capacity digital service for another decade.

In New York, the State University of New York (SUNY) is planning to connect 64 state-funded campuses and 32 community colleges using EmpireNet, a statewide, high-capacity digital backbone net designed to consolidate the state's various networks.

"The idea is to overcome geography as a barrier," says Charles Blunt, deputy vice-chancellor of automated information systems for SUNY. "We can use electronic mail and videoconferencing to reduce the time and money university officials lose when traveling to and from meetings."

Eventually, EmpireNet may be used to broadcast classes to several campuses on demand.

"We have the philosophy that all SUNY students should have access to all the best computers, libraries and lecturers within the SUNY system," Blunt says.

In addition to education, welfare and law-related applications, network technology is helping state governments generate revenue through lotteries. In the past year alone, jackpots of more than \$40 million were distributed in Florida, California, New York and Pennsylvania. As the grand prizes in these lotteries grow, the volume of betting increases, as does the revenue accrued by the state.

In New York State, as many as 30,000 bets per minute are taken by some 5,700 lottery agents during the busiest period. Lotteries of this magnitude would clearly not be possible without telecommunications networks.

How networks can help

Telecommunications technology can enhance the ability of state governments to work efficiently and offer improved service to their residents in the following ways:

■ **Faster service to residents.** Telecommunications has the potential to enable governments to respond more quickly to the requests of residents. Anyone who has waited for hours at the office of a state motor vehicles administration can probably appreciate the need for improved networking capabilities there.

■ **Faster decision-making within government.** Governments at all levels have always had difficulty making speedy decisions due to lack of access to needed information. Logistical telecommunications systems can help resolve this problem.

■ **Economic development.** Many state governments see networking as a way to contribute to economic development. For instance, some states that once depended on the agricultural or automotive industries for revenue are now trying to attract high-technology businesses to revitalize their economies.

One lure that can be dangled in front of high-tech firms is the advantage of a first-class telecommunications system, such as access through the network to supercomputer systems in universities as well as access to graduate courses and degree programs through video broadcasting.

Another long-term but very significant benefit is a more educated work force. Several states are pursuing this goal by using telecommunications systems to make engineering and science courses available to students who cannot readily come to col-

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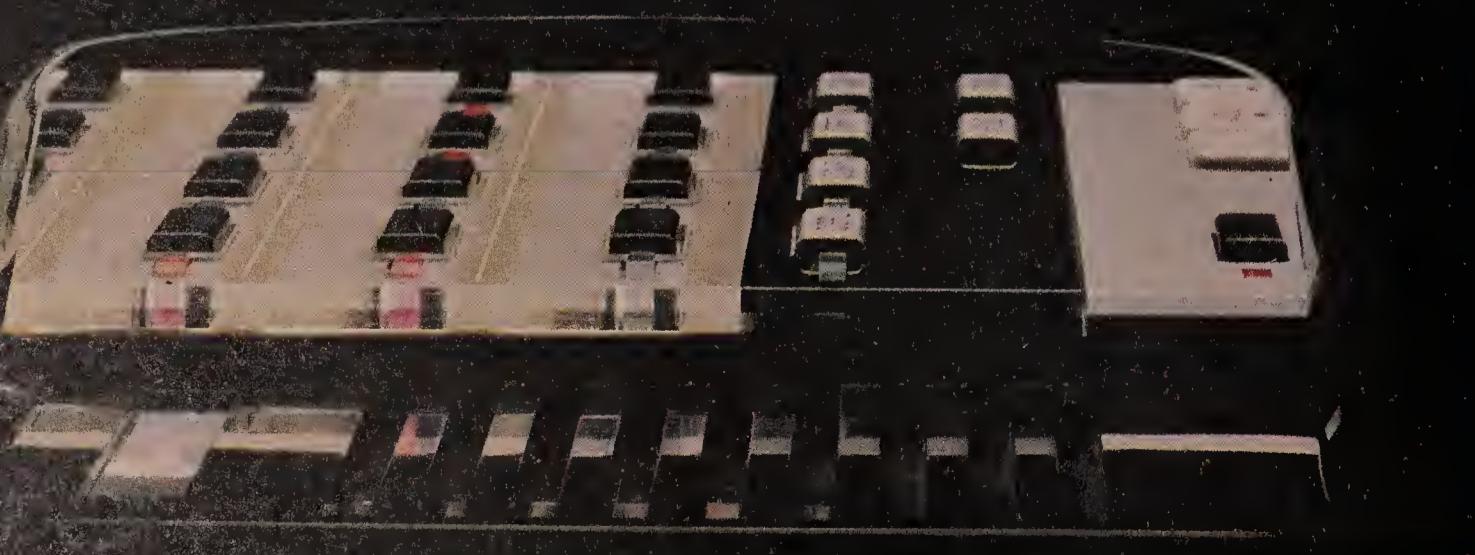
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Heaven-sent solutions

VSATs make satellites cost-effective for many wide-area networks.

By JOHN HUNTER

There's a relatively low-cost method of transmitting all forms of data over a wide geographic area that's neither pie in the sky nor a miracle. While the heavens are involved, the key players are communications satellites and very small aperture terminals.

Together, for between \$300 and \$500 per drop per month for a shared service, VSATs furnish a transmission medium that lets users transmit data without regard to distance throughout the continental U.S., Canada and Mexico.

VSATs make satellites competitive and desirable in the marketplace. Huge antennas measuring 100 feet across have been replaced by units as small as 1.2 meters in diameter that can be mounted on a pole or chimney, or set on a concrete pad.

VSATs are available for send/receive and receive-only applications, and most allow multiple VSAT stations (for example, personal computers, ASCII terminals and IBM 3270 workstations) to share the same transmission path to and from the satellite.

"VSATs are excellent for interactive traffic where tight response times are needed and are equally suited for large file transfers," says Phil Arst, president of Communications Strategies Associates, Inc., a Cupertino, Calif., consulting firm that designs and evaluates VSAT networks.

"The Ku-band VSATs are well-suited to running multiple applications using different protocols simultaneously," Arst says, "and some can be

Hunter is president of TMS Corp., a telecommunications consulting firm in Devon, Pa.

equipped to handle voice and video."

However, the latter two applications have drawbacks, which will be discussed later.

Network composition

VSAT networks have either a receive-only or a send/receive configuration. With the latter, multiple stations transmit to a satellite, which in turn relays data to a central earth station or hub.

The earth station distributes the data to end locations such as host mainframes by way of terrestrial lines, microwaves or the satellite itself. Hubs or earth stations can also transmit to other VSAT stations. Hubs can cost up to \$1 million or more and are used mainly by VSAT service providers such as Contel ASC, Hughes Network Systems, Inc. and GTE Spacenet Corp.

Smaller, private networks opt for their own send/receive or receive-only equipment that allows the satellite transmission and data dissemination to terminate at a single location. Typical send/receive VSATs cost about \$10,000, while receive-only units are priced around \$2,500.

Retail stores and hotel chains are big users of VSAT systems. Depending on the network design, a single broadcast can reach hundreds of terminals spread over wide geographic locations. But that doesn't mean VSATs are useful only for widely dispersed locations; they can also link users located in the same metropolitan area.

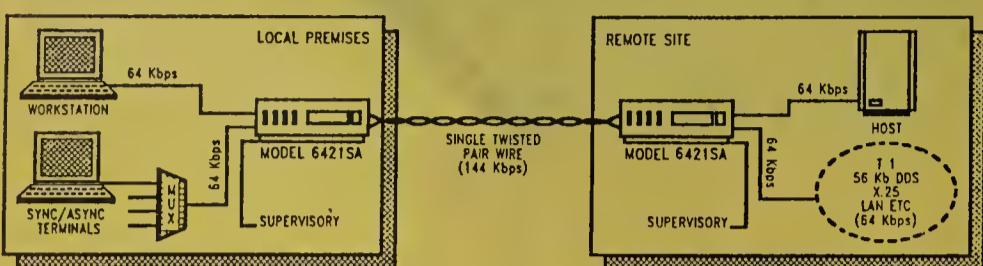
In addition, VSATs can serve as the backup com-
(continued on page 32)

Chart Guide

The features and prices of various VSATs are listed in a chart on page 32.

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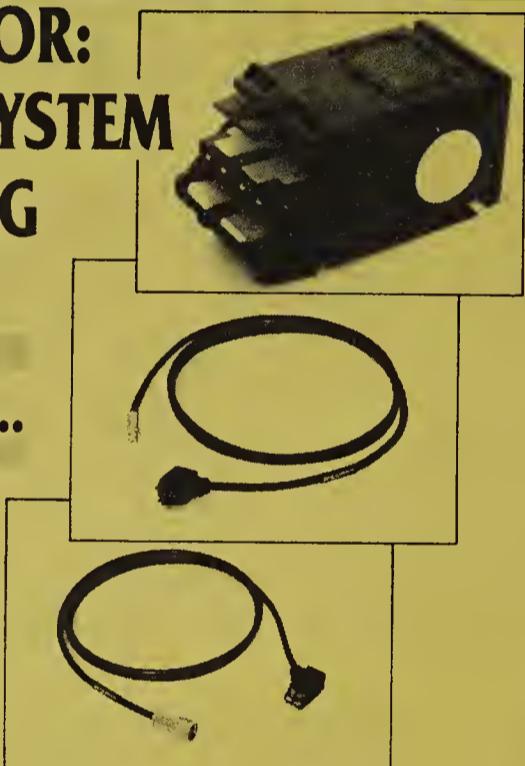
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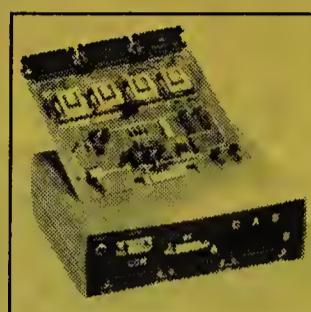
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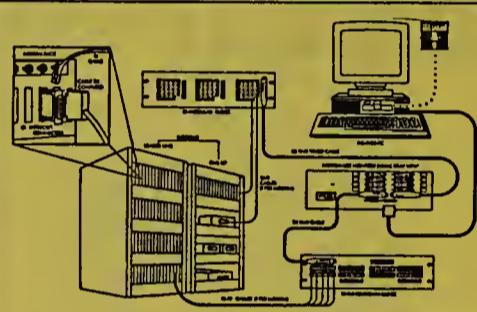
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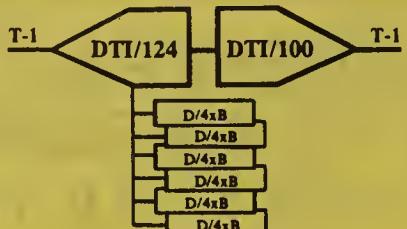
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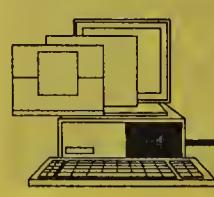
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Vendor	Product	Type	Antenna diameter (meters)	Antenna receiver gain (decibels)	Transmit/receive frequencies	Power output (watts)	I/O data rate (bit/sec)	Modem speeds (bit/sec)	Bit error rate/energy per bit over noise base level (decibels)	Data interface	Data protocols	Access protocol	Wind velocity (operating/survival)	Typical price
AT&T Bedminster, N.J.	Skynet Star Network Service	Ku-band, multiple channels per carrier	1.2 to 3.4	45 to 46	14GHz to 14.5GHz/11.7GHz to 12.2GHz	2.5	62.5K and 125K/125K and 250K	62.5K and 125K	10 ⁻⁷ /14	RS-232-C, RS-449, V.35, DS1	IBM SDLC, BSC, asynchronous	CDMA, Slotted Aloha	45/125 mph	\$9,850
	Skynet Clear Link	Ku-band, multiple channels per carrier	1.8	21.5	14GHz to 14.5GHz/11.7GHz to 12.2GHz	.5 typical; 1 maximum	32K or 64K/512K	NA	10 ⁻⁷ /NA	RS-232-C, RS-449, V.35	IBM SDLC, BSC, X.25, asynchronous	TLCP	50/125 mph; 45/125 mph	\$9,665
ComStream Corp. San Diego, Calif.	StarLink	Ku-band, single channel per carrier	1.2; 2.4 optional	21 (1.2); 23.3 (2.4); both at 0 degrees elevation	14GHz to 14.5GHz/11.7GHz to 12.2GHz	2	9.6K to 1.55M	9.6K to 1.544M	10 ⁻⁷ /5.7 (1.544M); 10 ⁻⁷ /5 (56K); 10 ⁻⁷ /5.8 (all other speeds)	RS-449, RS-442 standard; RS-232-C, V.35, T-1, DS1 optional	Transparent	Dedicated channel	65 to 80/125 mph	\$10,000
Contel ASC Mountain View, Calif.	C-200	C- or Ku-band, multiple channels per carrier	1.2	23 (C-band); 27 (Ku-band); degree of elevation NA	6GHz/4GHz (C-band); 14GHz/12GHz (Ku-band)	1 (Ku-band); 1 or 5 (C-band)	153.6K/153.6K	1.2K to 9.6K	10 ⁻⁷ /NA	RS-232-C, RS-422	X.25, IBM SDLC, 3270 BSC, 2780/3780, PARS asynchronous, Unisys Corp. Poll-Select	CDMA	62/125 mph	\$6,000
	K-300	Ku-band, multiple channels per carrier	1.8, 2.4	19.7 (1.8M); 22 (2.4M); both at 25 degrees elevation	14GHz to 14.5GHz/11.7GHz to 12.2GHz	1.25	56K/125K	19.2K; 56K to 125K	10 ⁻⁷ /8	RS-232-C, V.35	IBM SDLC, X.25, asynchronous	TDMA	85/125 mph	\$14,360
Cylix Communications Corp. Memphis, Tenn.	Cylix VSAT	Ku-band, multiple channels per carrier	1.8 to 2.4	20	14GHz to 14.5GHz/11.7GHz to 12.2GHz	2	56K/56K	Up to 19.2K	10 ⁻⁷ /4.6	RS-232-C	IBM SDLC	DAMA, TDMA	85/125 mph	\$9,000 to \$11,000
GTE Spacenet Corp. McLean, Va.	Sky Star	Ku-band, multiple channels per carrier	1.2, 1.8, 2.4	21 at 30 degrees elevation	14GHz to 14.5GHz/11.7GHz to 12GHz	1.5 or 3	56K/56K	Up to 19.2K; 56K	10 ⁻⁷ /6.5 to 7.7	RS-232-C, X.21bis, RS-423 standard; V.35, RS-422 and RS-449 optional	IBM SDLC, BSC, 2780, 3780, X.25, asynchronous, Unisys Poll-Select	Slotted Aloha, TDMA	70/110 mph	\$9,000 to \$10,000
Hughes Network Systems, Inc. Germantown, Md.	Personal Earth Station	Ku-band, multiple channels per carrier	1.2 to 2.4	NA	11.7GHz to 12GHz/14GHz to 14.5GHz	Up to 3	120K/512K	128K to 512K	10 ⁻⁷ /6.5	RS-232-C, RS-422, V.35	IBM SDLC, BSC, X.25, Unisys Poll-Select, Digital Equipment Corp. DDCMP, Asynchronous X.3 PAD	NA	60 to 70/125 mph	\$12,000
NEC Corp. Radio and Transmission Division Herndon, Va.	NET Star I	Ku-band, multiple channels per carrier	1.2, 1.8, 2.4	21 at 30 degrees elevation	14GHz to 14.5GHz/11.7GHz to 12GHz	1.5 or 3	56K/56K	Up to 19.2K; 56K	10 ⁻⁷ /6.5 to 7.7	RS-232-C, X.21bis, RS-423 standard; V.35, RS-422 and RS-449 optional	IBM SDLC, BSC, 2780/3780, X.25, asynchronous, Unisys Poll-Select	Slotted Aloha, TDMA	70/110 mph	\$8,000 to \$10,000
Scientific-Atlanta, Inc. Atlanta	SkyLinx.25	Ku-band, multiple channels per carrier	1.2, 1.8, 2.4	44.8; degree of elevation NA	14GHz to 14.5GHz/11.7GHz to 12GHz	1 to 4	56K/56K	Up to 19.2K; 56K	10 ⁻⁷ /13	RS-232-C, RS-449, V.35	IBM SDLC, UDLC, X.25, asynchronous	Slotted Aloha, TDMA	45 to 60/125 mph	\$10,750
	Single Channel Per Carrier	Ku-band, single channel per carrier	1.2, 1.8, 2.4	44.8; degree of elevation NA	14GHz to 14.5GHz/11.7GHz to 12GHz	1 to 4	56K/56K	Up to 19.2K; 56K	10 ⁻⁷ /13	RS-232-C, RS-449, V.35	Transparent	Dedicated channel	45 to 60/125 mph	\$10,750

BSC = Binary Synchronous Communications

CDMA = Code Division Multiple Access

DAMA = Demand Assignment Multiple Access

DDCMP = Digital Data Communications Management Protocol

NA = Information not available

PARS = Programmed Airlines Reservation System

SDLC = Synchronous Data Link Control

TDMA = Time Division Multiplex Access

TLCP = Trident Link Control Protocol (combines Slotted Aloha, Aloha and TDMA)

UDLC = Universal Data Link Control

This chart includes a representative selection of vendors in the VSAT market. Most vendors offer other VSATs, and many vendors not included offer a full range of competitive products.

SOURCE: TMS CORP., DEVON, PA.

Heaven-sent solutions

continued from page 25

communications link in disaster recovery networks. The fire in Illinois Bell Telephone Co.'s Hinsdale, Ill., central office last May has made believers out of a lot of people who used to scoff at disaster recovery nets. VSATs are also a good way to bypass failed central offices — or central offices in general — and network node locations that are not operating.

Main components

VSATs consist of an antenna, a radio frequency module, modems, data interfaces and protocol-handling software. For send/receive units, the software uses data protocols such as IBM's Synchronous Data Link Control as well as network access proto-

cols that permit different terminals to obtain space at the same time on a high-speed composite channel running to the satellite.

The receive-only VSATs handle asynchronous or synchronous data not requiring protocol acknowledgment. The technique used by the network access transmission protocol, as will be explained shortly, is very important because it directly affects the efficiency of the network.

VSATs are available with a variety of antennas that have diameters ranging from 1.2 to 4.5 meters. All things being equal, the larger the diameter, the greater the signal-gathering strength of the unit at its focal point. Therefore, for smaller antennas, the satellite must furnish a stronger signal. Many VSATs compensate for small-diameter antennas by using highly sensitive amplifiers.

VSAT and terminating locations use modems to convert the network access protocols back into data-handling protocols such as SDLC.

All data traveling between VSAT stations and the earth station, and vice versa, is checked for errors by forward error-correcting algorithms. That obviates the need for conventional retransmissions when errors are detected and substantially increases overall throughput because the network isn't clogged with retransmissions.

Within the VSAT network, the data traveling from the VSAT to the hub is called inbound transmission, and data from the hub to the VSAT is designated as outbound.

Different multiplexing schemes allow multiple stations to share one composite carrier.

The earth station send/receive site usually employs statistical multiplexing, which may cause some delays during heavy traffic periods but permits more stations to be serviced by the composite than could be serviced with time-division multiplexing. Statistical multiplexing is good for short, bursty traffic, but overall throughput degrades when long files are transferred.

Channel accessing

With send/receive units, the inbound channel usually supports multiple stations contending for a position on the channel transmitting to the satellite. Therefore, some scheme is required to ensure smooth traffic flow with a minimum of contention.

One of the more common schemes is time-division multi-

plexing access, which assigns each station a time slot on the composite. While that scheme guarantees that all stations wishing to transmit will receive permission, the overhead associated with granting such permission at the local and remote earth station sites is usually high.

Of course, there is also the 270-msec propagation delay to and from the satellite, which further degrades service.

Another delay occurs when the remote stations are polled. Because of the propagation delay, the overhead associated with polling and the time-sensitive nature of protocols such as IBM's Binary Synchronous Communications, polling is not performed from the hub in VSAT networks. Instead, a scheme called "spoofing" is used to trick the host computer at the hub site and VSAT sta-

tions into believing that actual polling is taking place.

Joseph Rinde, director of product planning for Contel ASC in Mountain View, Calif., explains spoofing this way: The host computer interface at the hub emulates all controllers in the network. When the host issues a poll, the hub responds to it.

At the VSAT, polls are created that address the controllers or stations, and data to be sent is transmitted to the hub, where it is stored until the next host poll is received. At that time, the stored data is passed directly to the host.

Information obtained by *Network World* indicates that polling accounts for up to 40% of all traffic, so keeping polls off the inbound and outbound channels boosts performance. All vendors in this Buyer's Guide support spoofing.

Aloha, mainstreamer

Another popular contention scheme is called Aloha. Developed by the University of Hawaii, it assumes that channel capacity will be available when a station attempts to transmit.

One variation, called random Aloha, permits stations to transmit at any time on the assumption that no other station is transmitting at that time. If one is, a collision occurs and all stations involved go into a random time-out phase before attempting to retransmit. (Sounds like the carrier-sense multiple access with collision detection used with local-area networks, doesn't it?)

Obviously, the length of the time-out and the satellite propagation delay have an adverse effect on overall throughput. The consensus of the vendors interviewed is that with random Aloha, saturation occurs when channel utilization reaches 18% on a 56K bit/sec channel.

A variation of Aloha that increases performance is called fixed slotted Aloha, in which stations are synchronized to start transmission at the beginning of the time slot. Such slotting, however, wastes channel capacity because all messages are not equal to the size of the time slot.

If the time slot is too large, capacity is wasted; if the slot is too small, the data to be transmitted must be spread over other time slots. NEC Corp. (and GTE Spacenet, which uses NEC equipment) has developed a scheme that increases efficiency and throughput when packets are too large for their slots.

According to Phil Arcoria, manager of satellite marketing at NEC, the company's protocol uses fixed slotted Aloha, which supports random and fixed time slots. If a packet is too large, a flag is set in the time slot to indicate that the remainder of the data associated with that packet is contained in the next available frames.

At the hub, a reservation is established identifying the frames carrying data associated with the

packet. Cylix Communications Corp.'s Demand Assignment Multiple Access scheme uses a similar technique.

Contel ASC takes an entirely different approach to access protocols with its C-200 transceiver. That unit is the only commercially available VSAT employing spread spectrum technology, which uses a wide bandwidth to spread the power of the signal over a wide frequency spectrum.

Unlike conventional radio sig-

node. Individual VSATs transmit to the earth station and receive data, voice and video from it by way of the satellite.

Hubs can be public, shared units or private if the customer has especially deep pockets (typical hub costs range from \$750,000 to \$1.5 million). However, for a small to medium application, a \$10,000 earth station will probably do. If customers only need to receive information, they can use a relatively simple

locher, VSAT product manager for Houston International Teleport, a Houston-based provider of public hub service. Berlocher's service uses ComStream equipment, which works with Houston International Teleport's access protocol.

Will hub service help a company wishing to take on the programming task? "I don't know any that will," Arst says.

"We certainly won't," affirms Berlocher.

VSAT systems use one of two frequency bands: C-band or Ku-band. Only one company, Contel ASC, sells both types of systems. C-band systems and Ku-band systems cannot talk to each other.

Are VSATs worth it?

Questions are frequently raised as to the drawbacks of VSATs and whether they are worth the money. Like everything else, the answers to these questions depend on the application. On the downside, every vendor admits that rain has an adverse effect on VSAT transmission and recommends that large-diameter antennas be used in areas with heavy rainfall.

Another drawback is the lack of switching. Satellites do a fine job of providing relatively low-cost data paths for large, far-flung networks, but existing ones can't switch data. (Although multihop satellite links can be used for switching, they introduce long delays.)

The National Aeronautics and Space Administration is experimenting with a satellite transponder that has switching capabilities, but such a satellite is years away from commercial availability. Still another drawback is the lack of extensive protocol handling. As the chart on page 32 shows, some VSATs sup-

port only SDLC, BSC and asynchronous data.

The weakest link in the network — besides the satellite — is the hub. When that unit fails, the network, for all practical purposes, is dead.

The way around that, of course, is to have dial backup to reach all desired locations. This is an effective solution, provided only low-speed transmissions (9.6K bit/sec and below) are involved. However, many VSATs support 56K bit/sec, which requires the availability of some other high-bandwidth facility such as AT&T Switched 56.

VSAT detractors also point out that the units are not well-suited for voice transmission and are very expensive for video transmission. They're right.

Since VSATs are star networks, all calls terminate at the hub. To reach other hubs, multihop satellite links are needed — and people won't tolerate the delays inherent in them — or expensive terrestrial or microwave facilities are required.

Video still isn't popular, mainly due to cost. "Most service providers charge around \$600 per hour for one-way video on a satellite," Berlocher says.

Another cost consideration is the VSATs and hubs. VSAT stations typically run between \$8,000 and \$10,000, and private hubs are priced out of range for a lot of companies.

However, subscribing to a shared hub costs between \$300 and \$500 a month per drop (including satellite transponder space). That isn't too bad considering that transmission is not distance-sensitive.

For many companies saddled with astronomical leased-line or dial-up telephone bills, VSATs are, well, almost heaven-sent. □

Questions are frequently raised as to the drawbacks of VSATs and whether they are worth the money. The answers to these questions depend on the application.



nals, which concentrate power in a small frequency range, spread spectrum disperses the signals over a wide bandwidth. The spreading results in a low signal-to-noise ratio that makes detection or interception of the signal difficult.

The low signal-to-noise ratio also increases the likelihood of erroneous reception by the intended receiver, however, so spread spectrum sends multiple symbols — called chips — for each bit throughout the frequency range. As long as enough symbols get through, the data bit can be identified.

Contel ASC uses a pattern of 2,048 chips per bit at 1,200 bit/sec, and the VSAT multiplexes them based on a set of distinct patterns or codes. Unlike other VSATs that multiplex based on time or frequency, the Contel ASC unit multiplexes based on code and, hence, has the name Code Division Multiple Access.

The vendor claims that as many as 100 simultaneous 1,200 bit/sec transmissions can be sent in each 5 MHz of bandwidth with an error rate of 10^{-7} or better.

Spread spectrum drawbacks

Communications Strategies' Arst agrees with Contel's technical claims but points out a few significant drawbacks to its spread spectrum.

"The inbound channels are limited to 1,200 or 9.6K bit/sec, where typical Aloha runs at 56K [bit/sec]. Since the overall throughput is less, the response time increases," he says.

As for cost savings, Arst says he doesn't consider spread spectrum to be an exceptionally good deal. "The cost of an inbound channel is only about 10% of the total cost of a satellite service, so there's no real savings to speak of."

The large VSAT networks use a star configuration with a hub or earth station as their controlling

\$2,500 VSAT to do the job.

All vendors in this Buyer's Guide, except NEC and ComStream Corp., offer full VSAT service, including satellite transponders and hub services that can be dedicated to individual customers or shared by many.

Vendor hubs and earth stations are designed to operate with their own VSATs; thus, it's difficult to use third-party products. The roadblocks are the uniqueness and proprietary nature of the access protocols employed by each vendor.

Switching vendors

Can someone who really wants to switch hub or earth-station vendors do it? "Not without much pain and a whole lot of software expertise," states Greg Ber-

"We like the Codex 2382 high-speed modem for its brains, its brawn and its underdeveloped price."

See us on page 39.

Doing more with less

continued from page 24

lege campuses. In this way, the states hope eventually to provide the type of well-educated work force that high-tech businesses require.

Cutting costs

The potential for cost reduction in state telecommunications networks is enormous. Many state agencies currently use dozens of overlapping networks to conduct business. These individual networks often serve the same metropolitan centers and could be consolidated easily into a shared network topology.

States that migrate from many spaghetti-like networks to a shared backbone net-

work can reduce telecommunications budgets through the resulting economies of scale.

Pennsylvania, for example, is currently integrating several of its agencies that had operated independent microwave networks, including the Department of Transportation and the state police, into a single microwave backbone network. This consolidation will eliminate the need for much of the microwave equipment. In addition, the network management efforts of all of the agencies can be scaled back since a centralized network control center will handle such functions.

A statewide network also allows individual agencies to reduce or eliminate their requirements to support, manage and configure their own networks. These are currently important considerations be-

cause budget cutbacks are making it difficult for states to attract people with expertise in telecommunications.

The shared networking approach also implies that the agencies' network management costs decrease as typical functions such as billing, order processing and trouble ticketing are centralized.

When a state decides to implement a strategic statewide network, it must consider whether to purchase the networking equipment and manage the network itself, or lease a comprehensive telecommunications service from a common carrier. The decision will hinge largely on the economic position and the in-house telecommunications expertise of the state.

While some states such as Illinois have elected to manage their own networks using state employees, it is becoming far

more common for states to procure a service from a telecommunications carrier.

Aside from the financial benefits of networking, it enhances the productivity of state government workers. Employees who formerly had to wait to receive reports by mail could have access to information from across the state within seconds. Clearly, networking serves both state employees and taxpayers by maximizing the ability of state employees to provide services to taxpayers on a timely basis.

Digital advantages

Digital transmission systems continue to be more cost-effective than their analog counterparts, and they provide a unique opportunity for governments to offer higher quality service to user agencies while simultaneously reducing costs.

Current New York State Lottery operating costs approach \$27 million annually under existing analog tariffs. By using EmpireNet's digital technology, the lottery hopes to reduce its costs to \$11 million.

A major bonus, above and beyond the \$16 million savings, is the improved service that lottery agents will receive from digital technology. The analog circuits lottery agents currently use to transport lottery traffic require two phone lines at the agents' locations: one for lottery transactions and one for voice communications. EmpireNet will use data-over-voice technology to transmit both voice and data traffic over the same two-wire circuit.

Another drawback to the analog configuration is that when one terminal location in a lottery multipoint circuit fails, all terminals on the multipoint circuit are rendered inoperable.

In contrast, EmpireNet's digital bridging scheme isolates a failed lottery terminal without affecting service to other lottery terminals on the circuit.

Practical lessons

Any state with overlapping networks can benefit from a consolidated network approach. Because the services provided by most major state agencies are likely to reach the same end users, there will probably be several overlapping agency networks.

Most states have enough voice traffic between their largest population centers to justify using private facilities. The possibility of integrating data, facsimile and video traffic with the current voice traffic makes an even stronger case for an integrated private network.

The first step in developing a statewide strategy is to determine what telecommunications equipment the state currently owns and what carrier services it uses. A detailed inventory of both switched and dedicated facilities should be compiled, and the cost of each service in dollars per minute should be calculated.

As a rule of thumb, if intrastate calls exceed 15 cents per minute, then networking alternatives will probably lower telecommunications costs.

Each agency should determine the amount of voice, data and facsimile traffic it carries and then analyze the cost of carrying this traffic. Once the traffic from separate agencies is organized according to city of origination and city of destination pairs, it will often be evident that dedicated — possibly T-1 — facilities are justified.

For most intrastate distances, eight to 12 voice-grade circuits between two locations will be more economically served by a T-1 span. When estimating the number of voice-grade equivalent circuits between locations, account for growth rates in exist-



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ing circuit types and potential applications, such as video.

After it has been determined that a statewide network would be appropriate, a request for proposal should be issued to a select group of telecommunications carriers. It is crucial to the success of the procurement that the RFP define all the features that the state wants the network to provide.

Write a careful RFP

While this seems like common sense, far too many procurements fail because the RFP left bidders room for interpretation.

If possible, define technical and financial formats that vendors should adhere to in their proposals. Define how vendors should convey their prices during the implementation period.

All bidders should provide cut-over schedules and detailed implementation costs in order for the state to make a fair comparison of the total costs incurred during the implementation period and the term of the contract.

It is necessary to carefully evaluate all proposals, weighing such factors as a vendor's resources, past performance and overall responsiveness.

After a vendor or team of vendors is selected to provide the network, the state must do a thorough job of selling the network to user agencies. The financial benefits of using the network and the specific network features that will enhance each agency's telecommunications capabilities should be highlighted.

Most agencies will not be content simply to save money; they want to see options that will allow them to carry out their operations more effectively.

One potentially sensitive issue is deciding which network management capabilities will be made available to agencies already possessing sophisticated management hardware and software.

In a shared network, a state cannot allow individual agencies to conduct diagnostic tests and reconfigure circuits without inviting sheer chaos. Instead, the state should provide ways to allow each agency to monitor its circuits on an end-to-end basis. Then, when an agency detects a problem, it can refer the problem to a centralized network management facility that will initiate all corrective testing from a single location.

Trends

Several key trends have emerged in the last two years. These trends tend to mirror the direction of many large users, but they also reflect the unique situation of governments.

Net consolidation. State governments are reaching the same conclusion as many of their private sector peers: They have too many disparate, independently managed networks, and they are paying too much for them. The obvious answer to this problem,

at least from a procurement standpoint, is to consolidate.

There are two approaches to consolidation: physically consolidating the disparate networks by procuring a high-capacity network on which the other networks ride, or obtaining a bulk purchase discount by procuring a service.

With the latter approach, the state does not actually purchase anything. Instead, it contracts for communications services at an attractive rate made possible by pooling all the state's requirements.

Procurement approaches. Two procurement approaches have become commonplace. One approach, used by states such as Pennsylvania, Ohio and Texas, is to lease or purchase the network switching and transmission equipment, and to obtain circuits from carriers so that the system can be operated and managed in-house.

A newer approach, adopted by states such as Indiana and New York, is to procure an end-to-end service from a vendor. In this arrangement, the state does not actually purchase any hardware; instead, it obtains what is in essence a bulk purchase agreement from the vendor to provide needed services.

Each approach has its advantages and drawbacks, but considering the current fiscal crises in which many states find themselves, the services approach deserves a second look.

Net management needs. The need for sophisticated network management techniques is becoming a central issue for state governments. While consolidating high-capacity networks can provide significant cost savings, it can also carry increased risks. The failure of a single link in such a network can take thousands of users out of service unless appropriate backup measures are taken.

In addition, end users of a consolidated network need to have the tools to determine whether the service they receive from a consolidated network is adequate for their needs.

Network management in a shared network environment is not easy to achieve. Indeed, several recent procurements reveal that network management capability is becoming a key factor in the selection of vendors in the state government market.

A few years ago, most state government telecommunications organizations were quiet backwaters dominated by the telephone industry. Now, however, states are beginning to use their economic clout in the same way as Fortune 500 firms, and they are beginning to reap the benefits of this creative use.

Like many organizations in the private sector, state governments are finding that networks are no longer a luxury or a necessary evil; they are a survival strategy. □

AT&T wants pricing under wraps

continued from page 6

offered solely to the government and is not available to other customers," AT&T said in its filing.

In December, AT&T won 60% of the FTS 2000 contract, which could be worth as much as \$25 billion over the next 10 years. The new network will upgrade the government's existing analog network to provide voice, data and video services on an all-digital, fiber-optic backbone to about 90 federal agencies. US Sprint Communications Co. was awarded 40% of the contract and will serve about 30 agencies.

AT&T said public disclosure of FTS 2000 pricing information would hurt its chances of successfully competing when the contract is opened for rebidding during its fourth and seventh years.

"If AT&T's prices for the first four years are disclosed, US Sprint will have a substantial advantage in estimating the price AT&T will submit," AT&T said in its filing.

US Sprint is not required to file a public tariff for its FTS 2000 offering.

The General Services Administration, which oversees the con-

tract, can award as much as 40% of each network's traffic to the other carrier during the rebid. The decision to redistribute network traffic will be based on quality of service and new prices, which must not exceed the original bid.

MCI Communications Corp., a member of the losing FTS 2000

"If those rates are not public, it cannot be considered a tariff," MCI said in its statement.

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bidding team headed by Martin Marietta Corp., issued a blunt statement in response to AT&T's request for confidentiality. "Our reaction to AT&T's filing is simple: They have not complied with the law. The Communications Act [of 1934] clearly calls for the filing of rates. If those rates are not

public, it cannot be considered a tariff."

MCI has already objected to AT&T's first Tariff 16 service plan, which was offered to the Department of Defense for installations in Hawaii. But even if the Defense Department offering were delayed or rejected, it probably wouldn't have a bearing on the FTS 2000 tariff, according to John Cimko, chief of the FCC tariff division.

"FTS 2000 is orders of magnitude different than that original filing [for the Defense Department]," Cimko said. "The resolution of issues related to the first Tariff 16 filing will not set the stage for the way FTS 2000 is resolved," he said.

On the issue of allowing AT&T to shield its prices from public disclosure, Cimko said the FCC's decision will not set a precedent because the FTS 2000 case is unique. Tariffs usually deal with a general class of users, but the FTS 2000 tariff is a filing for a single customer.

Cimko said AT&T has been allowed to keep prices secret in a few other instances, but only in cases that dealt with military installations or matters of national security. □

Timeplex boards upgrade T-1 line

continued from page 17

can simultaneously transmit as many as four T-1 signals to local devices, up from the previous maximum of two simultaneous T-1 signals per board.

This feature enables a Link node to pass a T-1 stream received from a central office directly to a T-1 port on a front-end processor.

Another feature supported by

the QSP board enables a Link node to transmit IBM Link Problem Determination Aid-1 (LPDA-1) signals from a central site to IBM modems on an analog tail circuit attached to a remote Link node.

LPDA-1 is a set of IBM proprietary commands that uses out-of-band signaling to monitor and control remote IBM modems in an IBM Systems Network Architecture network.

The QSP board converts LPDA-1's out-of-band signals to

in-band signals, which are transmitted via the T-1 network to remote IBM modems. IBM's LPDA-2 uses in-band signaling and is supported on Link nodes without the need for special hardware.

Expected to ship in April, the new boards range in price from \$5,000 to \$8,000, depending upon which features they are configured to support.

Timeplex can be reached at 400 Chestnut Ridge Road, Woodcliff Lake, N.J. 07675, or call (201) 391-1111. □

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NTI VP talks about IBM/Siemens threat

continued from page 7

questions about the direction of the IBM/Siemens product line answered sooner rather than later, Peterson said.

For customers in the midst of acquiring a PBX, he said his sales force and distributors are being trained to raise questions about the stability of the IBM/Siemens product line in users' minds. He said Northern Telecom employed a similar strategy when IBM announced the 9751, which was based on a different architecture than earlier Rolm switches.

"I think what we [told users about the 9751] last year has turned out to be very prophetic," Peterson said.

Northern Telecom expects product line

stability to be such a major concern among Rolm users that the firm will discontinue an incentive program established last January that gives sales representatives a \$40 bounty for every Rolm switch line converted to Northern Telecom, he said.

Peterson said users are seeking a consistent migration path from smaller to larger PBXs. He said Northern Telecom is developing a migration strategy and that the teaming of IBM and Siemens clouds this issue further for Siemens.

Battling AT&T

Northern Telecom will have to wage a tough battle against AT&T for disconsolate Rolm customers, Peterson said.

AT&T, through its Tariff 12, for example, can offer attractive long-distance service and telecommunications equipment

packages that minimize the cost of the equipment to customers, Peterson said. Northern Telecom, which has protested Tariff 12, is countering by working with other carriers such as MCI Communications Corp. to offer competitive packages, he said.

Northern Telecom was part of the Martin Marietta Corp./MCI team that bid for the recent multimillion-dollar Federal Telecommunications System (FTS) 2000 contract. The team lost out on FTS 2000.

Peterson said he hopes that Siemens will be more interested in making a sizable profit on each PBX sold than cutting prices to win market share. IBM may have focused too much on market share and this may have led to its partial exit from the PBX business, he said.

The 1989 outlook for Northern Tele-

com will depend greatly on whether Siemens focuses on making a profit in the PBX business, said Jay Samstag, a vice-president at Duff & Phelps, Inc., a Chicago-based investment firm. "I would think Siemens is probably very conscious about maintaining market share. If it thinks the only way to do this is by giving away the switches, it will be another long year for the entire industry," Samstag said.

Northern Telecom last week reported a \$22.6 million loss for its fourth quarter as a result of a \$200 million write-off to cover costs of closing plants and laying off or transferring employees. Without the write-off, the company would have earned \$112.4 million, down from \$136 million for the similar quarter the year before.

Northern Telecom reported revenue of \$1.5 billion for the quarter, up from \$1.3 billion for the fourth quarter the year before.

For the year, Northern Telecom earned \$165.6 million, down from \$328 million the year before. It reported revenue of \$5.4 billion last year, up from revenue of \$4.9 billion in 1987.

With PBX sales not expected to grow much over the next few years, according to industry watchers, Peterson said Northern Telecom is aiming to increase its profit-

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ability in 1989 by focusing on key product areas beyond traditional PBX voice lines.

Northern Telecom will attempt to sell more voice/data lines as a growing number of users demand the type of switching capability that such lines provide, Peterson said. Currently, about 7% of Northern Telecom's installed base of PBX lines are voice/data lines, according to The Eastern Management Group, a Parsippany, N.J.-based consulting and research firm.

"We're in the process of educating our salespeople in this area so that they will know what to talk about with a customer's data people," Peterson said. "This is an area of opportunity, as there is higher value and profitability in [voice/data lines]."

Northern Telecom will also focus on sales of PBX peripherals such as automated call distributors and voice mail products, Peterson said.

"Voice mail is coming on better for us now that we've made it a feature rather than simply a stand-alone system," he said.

Northern Telecom plans to pursue business aggressively overseas, Peterson said. The company recently sold \$250 million worth of switching equipment to Japan's Nippon Telephone & Telegraph Corp. and is hoping to secure a similar deal with Japan's equivalent of the local operating companies.

Peterson said foreign competitors, particularly the Japanese, are becoming increasingly aggressive and forcing prices down. However, he refused to comment on AT&T's recent accusations that foreign companies are dumping low-end PBXs and phone sets in the U.S. ("AT&T declares war on foreign vendors," NW, Dec. 26, 1988/Jan. 2). □

How to evaluate carriers' deregulatory proposals

WASHINGTON, D.C. — In its white paper on regulation of local telephone companies, the International Communications Association (ICA) offered some suggestions on how states should evaluate proposals for deregulation.

The report said regulators should establish criteria for determining whether or not a given service is sold in a competitive market.

"Telephone companies tend to rely on limited kinds of evidence to show the existence of competition in a market and frequently supply irrelevant data to support their contentions," according to the report.

The paper said only 17 states have objective standards for measuring competition.

When evaluating the competitiveness of markets, the ICA said regulators should come up with a measure it dubbed "Minimum Efficient Market Share." This is the percentage of a market a competitor must have to survive over the long term.

A service provider needs to

capture this minimum market share to get economies of scale that reduce its cost of operation. If it cannot capture this market share and its production costs exceed those of the dominant carrier, price competition could force it out of business.

If states choose to deregulate specific services, the report said they should require telephone companies to submit public manuals describing how costs will be divided between regulated and unregulated offerings. This manual could be used by regulators and consumers to ensure that companies do not subsidize competitive services with high tariffs in uncompetitive offerings.

Finally, the report said that regulation of telephone companies could be made easier by developing a central data base and an automatic data recovery system. Regulators and consumers nationwide could use the data base and system to get pricing and cost-allocation information about monopolistic carriers.

— Barton Crockett

to 90% of that used for data, Moley said.

"Fast-packet technology will replace circuit switching, just as digital has made analog transmission virtually obsolete," he said.

Moley predicted that fast-packet technology will be used for broadband Integrated Services Digital Network communications, metropolitan networks and private nets in the future.

Gaining momentum

Moley said StrataCom's Fast-Packet technology will distinguish the company from its rivals in the hotly contested T-1 multiplexer market. Conceding that Timeplex and NET sit atop the market, Moley said StrataCom will soon move ahead of smaller rivals — such as Digital Communications Associates, Inc., Avanti Communications Corp. and Newbridge Networks, Inc. — and will settle into third place in the market.

Moley has reason to be optimistic. In 1988, StrataCom increased its total revenues 400%, from \$5 million to \$20 million, and it has posted consecutive profitable quarters since the second quarter of 1988.

StrataCom's fortunes stand in contrast to the setbacks suffered by rivals Avanti and DSC Communications Corp., each of which laid off roughly 300 employees in the last two months.

StrataCom also will announce support for fractional T-1, the extended superframe format and the ISDN Primary Rate Interface later this year, Moley said. □

StrataCom mux debuts

continued from page 5
held from Feb. 6 to 8 in Washington, D.C.

With prices ranging from \$6,120 to \$50,000 depending upon configuration, the IPX 12 will compete against rival Timeplex, Inc.'s MiniLink 2, Moley said. Network Equipment Technologies, Inc. (NET) does not currently offer a low-end model but probably will do so by year end, he predicted.

StrataCom's other IPX models, the IPX 16 and IPX 32, already compete against NET's IDNX-20 model and Timeplex's Link family of T-1 products.

StrataCom's IPX 16 and IPX 32 switches support up to 16 T-1 trunks, and its IPX Hub digital switch supports up to 96 T-1 trunks. All IPX models use the same interface cards and software and are fully compatible. IPX 12 users can keep their interface cards and software when migrating to higher end IPX models.

FastPacket technology

StrataCom's FastPacket packet-switching technology allocates bandwidth on demand instead of reserving time slots or channels regardless of whether circuits are transmitting data. The technology also filters out gaps of silence that occupy bandwidth in circuit switching.

The intelligent allocation of bandwidth in fast-packet switching can save up to 60% of the bandwidth used for voice and up

ICA urges caution

continued from page 1

lators throughout the country, voices principles that will guide the users group's involvement in regulatory issues for the immediate and long-term future, according to Brian Moir, the ICA's legal counsel.

The report also contains suggestions on how to improve the process of evaluating proposals for regulatory reforms (see "How to evaluate carriers' deregulatory proposals," this page).

"The regional Bell [holding] companies have waged a widespread disinformation campaign [about the need for deregulation] with some success," Moir said. "We put [this report] out to present a more balanced analysis."

The report divides local telephone company deregulatory initiatives into four types:

■ **Social contract agreements**, in which carriers agree to accept limits on basic service rate increases in return for looser regulation of other services.

This can cost users because the basic services that carriers offer to shield from price increases would probably become less expensive anyway, the report claims. Carriers, it adds, usually have a monopoly over the services they want deregulated.

■ **Bundling**, in which a carrier groups existing services and claims the package constitutes a new product. Carriers then ask that they not be regulated on the new product because competition may emerge for the service.

The danger presented by this tactic, according to the report, is that the carrier may stop offering the old, unbundled services. If this is allowed, the report says, "it is possible that the majority of

a dominant carrier's captive customer base would lose its regulatory protection."

■ **Price cap regulation**, under which carriers are free to raise and lower prices within a preset ceiling. Unless regulators do an effective job of lowering this ceiling as technologies become more efficient, users may not enjoy savings from improvements to the public net, the report warns.

■ **Banded pricing**, under which local telephone companies can change rates within an upper and lower price range. The carriers can change prices within the limits with no prior approval and little notice. In monopolistic mar-

from the local loop.

In fact, as the number of advanced new services that depend on the local loop grows, the report argues, "the monopolistic power held by local telephone companies will actually increase."

Officials of the RBHCs disagreed with the report.

"It sounds to us like shades of Chicken Little," said a spokesman for US West, Inc. "The fact is that the current regulatory regime is stunting the growth of America's increasingly information-based economy."

Regulators were split in their reactions.

"It sounds to us like shades of Chicken Little," said a spokesman for US West, Inc.

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kets, carriers can abuse this freedom to overcharge customers or drive rivals out of business.

Little competition

If local markets become competitive, the report states, these reforms may be warranted. But in practice, little competition exists, and local telephone companies are pushing these reforms in markets they still monopolize.

The report concludes by saying that the growth of competition in the local loop will be "evolutionary" and that in some areas, effective competition may never arrive. It points out that most forms of competition for the regional telephone companies, such as private branch exchanges that attract Centrex customers, still depend on service

"Of course telephone companies make proposals for their own benefit, but they shouldn't be pilloried for this," said Gail Garfield Schwartz, deputy chairman of the New York State Public Utilities Commission.

"The important point is whether or not they are actually succeeding," she said, "and in this state, they are not."

The conclusions reached by the report were praised, however, by Kenneth Stofferahn, a member of the South Dakota Public Utilities Commission.

"In this state and others, the BOCs are pretty much getting what they want," he said. "These companies are very well-financed, and it's pretty tough in a state like this to successfully oppose them." □

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See us on page 39.

Barclays seeks dominion

continued from page 1

will spend nearly \$62 million on the domestic backbone project and more than \$150 million on the worldwide X.25 network.

Domestically, Barclays expects to replace by year end the nearly 8,000 stand-alone Burroughs Corp. and Ing. C. Olivetti & Co., S.p.A. workstations it now uses in its branches with IBM and NCR Corp. microcomputers attached to Ethernets. This will enable Barclays to settle on a single type of processor in each branch, making it easier to train staff and build applications.

The microcomputers will be used for back office tasks such as data entry of daily teller transactions and other financial data, which is transmitted each night to IBM 3090 mainframes at data centers in two English cities. The mainframes will process the information overnight and give back new account balances.

The Ethernets will be attached to Digital Equipment Corp. SNA gateways already installed in more than 2,000 branches. The gateways were developed by Barclays with help from DEC.

The gateways will transmit SNA traffic via a leased or dial-up line to the bank's nearest Northern Telecom, Inc. packet switch, which will wrap the SNA data in X.25 packets for transmission to a Northern Telecom packet switch at the data center. The central switch will forward SNA

data to the host, alleviating the need to run X.25 software on the mainframes.

This approach has eased networking tasks, Nicholas said. With BINS, the 8,000 stand-alone workstations were directly attached to the backbone network, meaning the mainframes in the data center had to poll each device. With the new backbone network, the host only polls the

computers will yield other benefits. For instance, the microcomputer's ability to support a common user interface gives the bank added flexibility, Nicholas said. Currently, staffers must be trained to run applications on the different minicomputers in each branch.

Minimal retraining

With the microcomputers, Nicholas said, Barclays will use menu-driven applications that most bank branch personnel will

This gives us the flexibility to increase our workstations from 8,000 up to maybe 30,000."

▲▲▲

2,000 SNA gateways, which in turn act as controllers for the Ethernet devices.

"This gives us the flexibility to increase our workstations from 8,000 up to maybe 30,000 over the next few years without in any way changing or incurring the problems of polling from the data center," Nicholas said.

About 780 of Barclays' 2,900 branches have been migrated from BINS to the X.25 network. The other branches will be moved to the X.25 network during the next two years, Nicholas said.

In addition to easing networking tasks, the IBM and NCR micro-

be able to use with little or no retraining.

"When you move staff from one branch to another — as we do regularly — they've got no learning curve with the microcomputers," he said. "In the old days, you could be moving around and one day be working on Burroughs, one day on NCR and another day find yourself moving onto an Olivetti."

Using microcomputers also reduces the cost of adding nodes to the bank's domestic backbone network, Nicholas said. Instead of adding dedicated workstations costing roughly \$10,000 each,

the bank can add microcomputers at less than half that cost. "The cost of the PC or intelligent workstation is much less than the cost of a back office machine," he said.

In addition, use of microcomputers puts Barclays in a position to take advantage of new communications and data processing technology as it is developed, Nicholas said. "The developments in [microcomputer] workstation technology are moving as fast, if not faster than, any other area at the moment."

Worldwide net

Barclays also intends to link each branch in England to its worldwide packet network. The bank has been installing BBN Communications Corp. packet switches at some of its larger international offices over the last three years.

Those BBN switches provide X.25 connections between DEC VAXes and Tandem Computer, Inc. NonStop minicomputers in its branches. These minicomputers support terminals in Barclays' branches.

The worldwide X.25 packet network is used primarily to exchange electronic mail among executives in the bank's worldwide branches. However, Nicholas said, the network will soon be used to move financial data from overseas locations to data centers in England by providing links between the BBN and Northern Telecom switches. □

Calendar

Feb. 1, New York — Communications Managers Association Business Meeting/Educational Session. Contact: CMA, Administrative Office, 40 Morristown Road, Bernardsville, N.J. 07924; (201) 766-3824.

Feb. 2-3, Boston — T1/T3 Networking. Contact: Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015; (201) 478-5400.

Feb. 2-3, San Francisco — Fiber Optic LANs: Speedy and Robust. Contact: InfoLAN Seminar Series, P.O. Box 162323, Austin, Tex. 78716; (800) 526-7469.

Feb. 6-8, Washington, D.C. — Communication Networks '89. Contact: Communication Networks, P.O. Box 9171, Framingham, Mass. 01701; (800) 225-4698.

Feb. 7-8, Las Vegas — Las Vegas Audiotext Convention/Expo. Contact: InfoText Magazine, P.O. Box 19740-155, Irvine, Calif. 92714; (714) 551-9179.

Feb. 7-10, Arlington, Va. — ICA Winter Seminar. Contact: International Communications Association, 12750 Merit Drive, Dallas, Texas 75251.

Feb. 8-10, New York — DEXPO East 89 Conference. Contact: Expocons International, Inc., 3 Independence Way, Princeton, N.J. 08540; (609) 987-9400.

Feb. 8-10, Orlando, Fla. — Selecting and Implementing Voice Messaging Systems. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521; (800) 227-1234.

Feb. 12-15, New Orleans — TELECOM '89. Contact: American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036; (202) 663-5000.

Feb. 13-16, Dallas — James Martin World Seminars. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402; (213) 394-8305.

Feb. 14-17, Mexico City — Telecommunicaciones '89. Contact: U.S. Trade Center, P.O. Box 3087, Laredo, Texas 78044; (905) 591-0155.

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Apple finds allies in LAN vendors

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sible network environments of the future, and Apple is assuring network managers that the Macintosh will be able to migrate from DOS to OS/2 local nets.

While Apple has made it clear that both strategies are key to its local network presence, both 3Com and Novell have been courting the microcomputer maker for attention. It appears Novell has clearly won the computer maker's favor for the short term. Consequently, Apple's relationship with 3Com seems to be eroding due to Apple's support for NetWare.

At the recent MacWorld Expo here, Apple officials did not even attend 3Com's Macintosh announcements (see "3Com expands functions of 3+ For Macintosh line," page 13). By contrast, Apple's top networking guru, Gursharan Sidhu, had been highly visible at a Novell event earlier in the week.

Further evidence of the deteriorating relationship between the two companies comes from 3Com President and Chief Executive Officer William Krause, who indicated that early users of the just released Macintosh SE/30 high-end microcomputer will have to look elsewhere for Ethernet adapters for the machine.

Krause said flatly that 3Com — the world's leading supplier of Ethernet boards, industry analysts agree — would

not make an Ethernet interface for the SE/30 unless Apple carries the board.

The lack of a united Apple/3Com front could not have come at a worse time for 3Com. Last month, the company's DOS-based 3+ network operating system lost one of its primary advantages over Novell's NetWare: It could support Macintoshes and NetWare could not.

Novell's release of NetWare For Macintosh in December negated that advantage. It gives network customers the option of buying a DOS-based NetWare solution today, instead of waiting till year end for 3Com's 3+ Open Macintosh support.

Although 3Com feels it deserves better treatment from Apple, Alan Kessler, director of marketing for 3Com's software products division, said Apple's pro-Novell stance will not inhibit its efforts to support

Macintosh with 3+ Open. 3Com has enlisted Pacer Software, Inc. of La Jolla, Calif., to help develop 3+ Open For Macintosh, and the company said the first release of the product will reach users in the fourth quarter of this year.

Despite 3Com's concerns that it will have to develop the technical ties between its 3+ Open and Apple's network environments, Apple still needs 3Com.

The local net vendor has managed to differentiate its LAN Manager strategy from the 30 other OEMs by promising Macintosh support. No other LAN Manager OEM has announced similar plans.

3Com has even talked about offering advanced network services above and beyond the basic print- and file-sharing capabilities it has promised for Macintoshes in OS/2 networks.

In addition to signing up Pacer to bolster its Macintosh software development, 3Com has begun to needle Apple's net strategy, pointing out its flaws.

Eric Benhamou, vice-president and general manager of 3Com's software products division, pointed out that there is no interprocess communications mechanism in the Macintosh that developers can use to create distributed applications — which will be crucial in an OS/2 local network.

"That's a big hole in Apple's networking strategy," Benhamou said. If Apple does not fill that hole soon, 3Com will come up with its own method to link Named Pipes, the LAN Manager's interprocess communications facility, to the Macintosh. However, without Apple's help, 3Com could be facing a monumental task. □

Nynex to beta test metro net products

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While the QPSX metropolitan network is technically sophisticated, the RBHCs want to shield customers from network complexity. Creating transparent access to the metro net has been a major focus of the metropolitan net development work by Bell Communications Research, Inc., the RBHCs' research and development arm.

"We're trying to provide a seamless interface between the customers who have their own local premises networks and the central office network," said Andres Albanese, district manager for metropolitan net research at BELLCORE. "There are lots of applications running in premises LANs. We want a [metro net] technology that will be transparent to all of these."

Most observers expect the first commercial services based on metro nets to be offered in the early to mid-1990s.

Nynex joins a growing number of RBHCs interested in trying to translate nascent 802.6 metropolitan net standards and product prototypes into actual service offerings. Interest in metro nets dates back to the early 1980s, when vendors were looking for a way to expand upon the benefits of fast access and high-speed transmission found in local networks based on the IEEE 802.X standards, according to George Koshy, senior consultant with BBN Communications Corp.'s telecommunications consulting group.

This early research languished mainly because vendor support failed to coalesce around a single viable technology, according to Koshy, who participated in some of the earliest efforts to craft an 802.6 metro network standard.

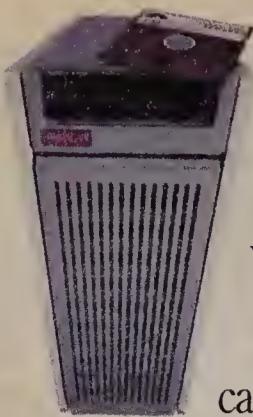
But, according to Koshy, interest rose sharply starting in 1987, when a media access control protocol was developed that created a metropolitan net architecture that had most of the strengths of local networks with none of their weaknesses. □

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